

PROGRESSIVE
MEDICINE





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PROGRESSIVE MEDICINE

A QUARTERLY DIGEST OF ADVANCES, DISCOVERIES
AND IMPROVEMENTS

IN THE
MEDICAL AND SURGICAL SCIENCES

EDITED BY
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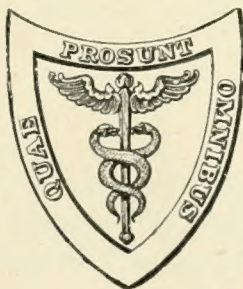
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VOLUME III. SEPTEMBER, 1919

DISEASES OF THE THORAX AND ITS VISCERA, INCLUDING THE HEART, LUNGS AND
BLOODVESSELS—DERMATOLOGY AND SYPHILIS—OBSTETRICS—
DISEASES OF THE NERVOUS SYSTEM



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PROGRESSIVE MEDICINE.

SEPTEMBER, 1919.

DISEASES OF THE THORAX AND ITS VISCERA, INCLUDING THE HEART, LUNGS AND BLOODVESSELS.

BY WILLIAM EWART, M.D., F.R.C.P.

AFTER the late war's destructive ordeal the objective is not mere reconstruction, but a regeneration of national health on sounder foundations. A rich harvest of fresh experiences is still on the road, the burden of which none can yet venture to foretell. Our aim has been to search each consignment of observations from the front, or from the home-studies which they have stimulated, for the great principles needed for that regenerative purpose. The latest facts and ideas claim priority and greater fulness of exposition, so far as possible in their original setting, for it is mainly to them that we must look to clear away any obstructive theories henceforth useless except as an interesting record of the past.

A National Physical Census and its Lesson. Between January 1 and August 31, 1918, the medical examinations conducted by the National Service Medical Boards in Great Britain amounted to 2,080,700. In less than 4 per cent. of this vast number was there any reason to believe that the grading by the boards did not correctly represent the degree of physical fitness of the individual. A more important aspect was that not more than 36, or 37, per cent., were placed in Grade I. That implies that only about one in every three of the men had attained the standard of health, of strength and of working capacity suitable to his age. The remainder, more than a million and a quarter, had not reached that standard. A careful analysis of the records proves that the men examined were a fair sample of the male population between the ages of eighteen and forty-three and between forty-three and fifty-one, not its mere "leavings." The experience of the boards examining women for national work tallies broadly with these findings. Both revealed a deplorably low state of national health, mainly due to preventable disease and to the ravages inflicted by industrial life. Too little food, too long hours of work, too little sleep, too little fresh air, too little play, too little comfort in the home are the chief factors concerned. The war,

while revealing the defect, has also led to emergency suggestions by the Health of Munition Workers' Committee, for the application of sound medical and hygienic principles. Although real improvement can hardly be expected for one or two generations, the foundations of a better national physique can and should be laid at once.

The Importance of the Food Factor. It is not generally suspected how largely success will depend upon a judicious diet reform. Meanwhile, science has at last entered upon an analytical study of the varied health-giving properties distributed among our vegetable foods. It has long been contended by raw-vegetarians that an adequate proportion of uncooked vegetable food constitutes our best insurance of health, by providing nature's curative foods in their unimpaired efficiency. It is impossible to foretell how far this new path of research may conduct us in identifying fresh etiological types of "deficiency disease" and of other diseases, and in their prevention and treatment.

Vitaminology is gradually extending its list of accessory factors of nutrition. Already it has been proved that the chemical influence of free alkali and the physical influences of heat and of dehydration considerably reduce the efficacy of the antiscorbutic factor. Prolonged boiling can abolish it, and it is almost completely destroyed by simple drying. The same also applies to the growth-promoting factor, water-soluble B. It is therefore probable that vitamins are of unstable molecular build; and that for the health purpose, as much of our vegetable supplies as we can enjoy in the raw state should not be cooked; while for the rest we should adopt the method of cooking least destructive of their beneficial action.

The Practical Importance of Vitamines. F. Gowland Hopkins's latest pronouncement on this vital question ends with the words, "We are yet at the bare beginning of its study." Whatever they may be, or their mode of action, there is no doubt as to their indispensability for nutrition and growth, for health and for life. "Vitamines may not be concerned with the structure of the tissues, but rather, as stimulants or catalysts, with the dynamic processes in the tissues. In any case they are nutritive essentials not directly concerned with the supply of potential energy. They must contain something made originally by living cells, vegetable or animal. All our natural foods are parts of tissues which have lived. We ultimately owe our supply of them to the plant. The plant makes and stores in small quantity certain substances which are essential to animals as the proteins and the starch which it makes in much greater abundance. Except for those who view nutrition too exclusively from the standpoint of energy supply, there is in this no reason for surprise. Without those minute accessories, perfectly wholesome and, from the standpoint of their own functions, absolutely necessary food-stuffs are not, in any complete and proper sense, utilized at all. They are absorbed, and the energy contained in them is liberated in the body. But the coordination of metabolism is absent; neither material nor energy is employed aright. Yet with that minute addition they become perfectly available as a whole.

Under the heading of the "Effects of Partial Deficiency of the Acces-

sory Substances," Hopkins pleads for a better understanding of the dietetic requirements of the population, and particularly of children. Disturbances in health may exist short of the developed symptoms of actual disease. Malnutrition may arise irrespective of the quantity of food eaten; not from insufficient, but from badly treated foods, or from an ill-chosen combination. Absence of an essential vitamine from the food means disease; but a mere relative deficiency may mean chronic malnutrition.

Rickets, though crippling, is not fatal in itself, yet a factor of supreme importance to the nation, because of its indirect effect upon the infantile death-rate. The mere suspicion that it may be due to a deficiency in fat-soluble A should concentrate our attention not alone on the quantity, but on the quality of the fat, in the diets of infants and of nursing mothers. Recent evidence suggests that vitamines are not made in the animal body. If that is so, the milk of a nursing mother fed on a diet deficient in them may ultimately lose most of its vitamine supply to the complete detriment of the nutrition of her child.

PULMONARY TUBERCULOSIS.

Of itself, the War has done nothing, neither has its stimulus elicited anything toward the conquest of tuberculosis. The approved routine of treatment, supposed to be copied from Nature, is still an incomplete and inefficient imitation. Her "whole cure" is not by open air sanitation alone. Our persisting neglect of her curative foods still chiefly retards therapeutic progress. Nevertheless the war has indirectly brought us nearer realizing that great omission. The shortage of food, by necessitating a rationing of the population and a systematic revision of the peace-time dietaries by experts, has powerfully stimulated research in the domain of the diseases of malnutrition. All diseases are malnutritions of greater or less degree, all more or less dependent upon an improved alimentation for the success of any form of clinical treatment. But the special affections which the discovery of vitamines has identified as "Food-deficiency diseases" claimed first attention. Although pellagra, beriberi, polyneuritis, and scurvy are comparatively rare among us, their successful study has been of unlimited service. In the first place it has led to the inclusion within that group of rickets, the most prevalent of all our debilitating diseases of early childhood, and to its masterly etiological and therapeutical investigation by the Mellanbys. This has paved the way for the belated study of the rational dietetics of tuberculosis.

The Role of Diet. If rachitis, a non-fatal and presumably non-infective disorder, has its cure and its prevention mainly in the diet that makes the purest blood, we can hardly expect to prevent and to cure an arch-infective disease without the help of the foods which supply the healthiest blood, and the most bactericidal. Meanwhile it is apparent from the latest circular issued by the Local Government Board in consultation with the Ministry of Health (November, 1918), substituting new tuberculosis dietaries for those previously in force, that this para-

mount principle has not yet been visualized by the authorities. The following are "The maximum weekly amounts for each male over ten years of age residing in the sanatoriums or special wards set apart for the treatment of tuberculosis: Meat, including suet, 56 ounces;¹ fish and poultry, 16 ounces; bacon, 8 ounces; bread, 64 ounces; flour, 8 ounces; sugar, 8 ounces; butter and margarine, 10 ounces; lard and edible fats, 3 ounces; potatoes, 80 ounces; vegetables (fresh), 28 ounces; milk, 14 pints; jam, syrup, etc., 8 ounces; cereals, 12 ounces; oatmeal, 8 ounces; peas, beans and lentils, 8 ounces; tea, 2 ounces; cheese, 4 ounces. The whole or any part of the meat ration may be butcher's meat, of which more than 2 ounces may be lard."

Since patients suffering from marked constitutional disturbance may be unable to take peas, beans and lentils, or the full amounts of potatoes and bread specified, any adult male patient certified by the medical officer of the institution to be so suffering and to require additional milk shall be entitled to not more than seven pints of milk weekly (or the equivalent in dried milk prepared from whole or separated milk) in addition to the amount specified. Females over ten years of age and children under ten will be entitled to four-fifths and three-fifths respectively of the amounts laid down for males over ten, except that in every case the patient will be entitled to 8 ounces of sugar and 3 ounces of edible fats weekly.

The Food Controller has laid down a diet scale for the resident medical and nursing staffs of such institution, but the scale applicable to patients will apply also to any individual member of the resident professional staff who is suffering from tuberculosis. The amounts of unrationed foods in the scales are not obligatory, but are included for guidance.

Our comment on that table is that no mention is made of any fresh fruit, and that the weekly allowance of fresh vegetables is only 28 ounces; while the nitrogenous supplies (flesh-food, 80 ounces, cheese, 4 ounces, pulses, 8 ounces, oatmeal 8 ounces), total up to 700 ounces, in addition to 64 ounces of bread and to 14 pints of milk. In chronic affections, mere abundance does not suffice: The kind of food is the determining factor. Nitrogenous food is indispensable as a tissue-builder, and as a stimulant. But it has little curative value; some of its products are toxic; and it is the *pabulum præ excellens* for the bacteria of disease. Fresh vegetable food has none of those objections. Its special office is "blood depuration"—more of it being needed in proportion as the supply of flesh-food is increased. For that reason it is the "antidotal" and the "curative" element in the rational dietetics not only of tuberculosis but of all diseases, and not least of asthma as we shall note in due place.

"*Non-specific Immunization.*" Wright's² latest suggestions cannot fail to stimulate clinical and experimental research in tuberculosis. For his new path-finding investigation he has provided a new vocabulary. Science, forever intent upon better methods cannot be satisfied with anything but the best nomenclature. This can only be found in the medical and scientific "defining" language, in the only language needing

¹ Cf. British Medical Journal, November 9, 1918; *ibid.*, March 9, 1918.

² *Lancet*, March 29, 1919.

no paraphrases, for clearness of logical thinking and for lucid expression. His nomenclature is briefly as follows:

Phylaxis is the activity of the body in guarding itself against infection. The leukocytes and the bacteriological substances in the blood are its chief phylactic agents.

Kataphylaxis (a term built on the same plan as kataphoresis and cataplasm) is the directing and the transporting of those phylactic agents to the seat of infection.

Antikataphylaxis is the result of the interference of any condition or influence that hinders that transportation.

Epiphyllaxis is the "mobilization" of any available force to reinforce the defence at the call of any supervening infection or of a protective inoculation, and also the body's "response" to that call. Whenever the dose is relatively too large, the primary response to it is the reverse of that which is intended; it produces a temporary depression of the resistance of the blood. This was formerly described by Wright as the "negative response" or "negative phase."

Apophylaxis is more explicit, and fits in with the rest of his analytical terminology. The "negative phase" is in reality an "apophylactic phase."

Ecphylaxis and the *ecphylactic state* are not the least likely to be of practical service to progressive research. These terms apply to the unprotected condition when the phylactic mechanism is overwhelmed either as a whole or in local areas.

Anaphylaxis and anti-anaphylaxis are not mentioned, presumably because, owing to their mysterious nature and to the exceedingly loose and varied acceptations they had previously been given (chiefly by clinicians), they do not quite harmonize with the clearness and simplicity of that eminently objective vocabulary.

A New Departure in Phthisiology of incalculable significance, is heralded by John Brownlee's "Investigation into the Epidemiology of Phthisis in Great Britain and Ireland."³ His analysis of the regional mortality statistics from the Decennial Supplements of the Registrar-General has led him to infer the existence of three distinct statistical types, one showing a maximum mortality in early adult life, a second reaching a maximum between the ages of forty-five and fifty-five and a third culminating between the ages of fifty-five and sixty-five; and, moreover (by the method of correlation), that the second or middle age component is related to the general healthiness or unhealthiness of the locality, whereas the other two components are relatively unaffected by environment. He concludes that the epidemiology of the two chief types of phthisis—namely, the "young adult" and the "middle-age" types—is different. The present epidemic of phthisis among the young had its maximum somewhere about the middle of the last century; but the epidemic of phthisis among the middle aged had its maximum fully 100 years ago. A considerable part of the decline of phthisis in recent years would thus be in line with the biological properties of diseases in general; and would

³ Medical Research Committee, Special Report Series, No. 18. H. M. Stationery Office.

have had little to do with hygienic conditions. For instance, in pneumonia, as there are at least four strains of pneumococci, for any successful treatment by antipneumococcic serum, a bacteriological diagnosis of the type of pneumococcus present would be essential. Etiologically, if there exist disparate types of phthisis in different geographical areas; and if, moreover, as in the case of the tin miners of Cornwall, certain occupations are locally characterized by the special incidence of a particular type upon both sexes, occupational phthisis must constitute a hitherto unsuspected factor. All this "points to the conclusion that phthisis pulmonalis is not a single disease but a group of diseases; coming thus into line with typhoid fever and bacillary dysentery, now known to be made up of varieties the causal organisms of which possess similar properties, and produce fevers which run almost the same course." Therapeutically, just as we cannot suppose that a vaccine capable of protecting against a paratyphoid infection will protect against true typhoid, it is also unlikely that a tuberculin prepared in one locality will necessarily be of value in another. For instance, Brownlee has never seen any demonstrable benefit from the tuberculin treatment in Glasgow; this may be because the "middle age" type of phthisis is rare in that city, while the vaccines may have been prepared from this type in London where it seems to have been the chief type for more than 200 years. As hinted in an editorial in the *British Medical Journal*, there is no novelty for bacteriologists in the mere suggestion of different strains of human tubercle bacilli. But there is a novelty in the demonstration by a statistician in the first instance of definite clinical types with distinct differences. This is a high tribute to the value of the statistical method. So far-reaching a conclusion will, however, need further verification before it meets with general acceptance.

The Medical History of the "Problem of Phthisis," which remained unsolved for nearly 3000 years, is outlined in masterly strokes in Percy Kidd's Harveyian Oration for 1918, "On the Doctrine of Consumption in Harvey's Time and Today." The attitude of Hippocrates toward it was similar to our own toward that of cancer. He overlooked the causal factor, the minute tubercles, and perceived only the suppuration and the ulceration. So did Celsus. Aretaeus first identified the differences between phthisis and empyema. Galen still speaks of its new products or *εμπύματα* as "inflammatory swellings" analogous to furuncles or buboes. His statement that "It is dangerous to live with consumptives, and with those whose foul breath imparts a heavy odor to the rooms in which they lie," is perhaps the earliest reference to its contagiousness; though Aristotle had expressed similar views concerning contagion. For the Arabian physicians, phthisis remained an ulcer of the lung. That doctrine was not challenged until the seventeenth century, in which two names stand out prominently, Franciscus Sylvius and Richard Morton.

Sylvius has been chiefly known as the author of a "purely chemical" theory of disease, soon forgotten, but again of some interest in these days of biochemical research. While still attributing phthisis to suppurative peripneumonia or pleurisy, he was the first to state that tubercles are often seen in the lung, and that they soften and suppurate to form

vomicæ. He regarded them, in the lungs and elsewhere, as glands so minute as to be invisible until enlarged by the accumulation of viscid humors or secretions—the earliest reference probably ever made to generalized miliary tuberculosis; and he was not far wrong, as tubercle was ultimately described by Virchow as a granuloma. He also suggested a relation to scrofula or struma, in which the external glands were likewise enlarged, and that the action of heredity was exerted through these glandular tubercles.

Richard Morton, the author of *Puretologia and of a Phthisiologia*, which was published ten years after Sylvius's *Opera Medica*, declared that the formation of tubercles constitutes the first stage in the phthisical process. His belief in the great prevalence of tubercle and in the frequency of spontaneous healing was prophetic. He described a special scrofulous variety of consumption, as the commonest in his experience, and as furnishing most cases of recovery. He also maintained that tubercles were found in the lungs in all cases of consumption, whatever its origin might be; and he agreed with Sylvius as to its contagious nature.

Sydenham added nothing to the pathology, but he recommended daily riding on horseback as the best help for a cure.

Morgagni, a pupil of Valsalva, dreading the contagiousness of the disease, carefully abstained from dissecting its victims. Valsalva had observed, in all the cases he had dissected, that the ulcers and disease were in the upper part of the lungs.

Pierre Desault, of Bordeaux, divided the causes of phthisis into "conjoint" and "antecedent." The conjoint cause is tubercle, which sets up the disease, its destruction leading to a cure. He rejected the view of all previous writers (except Willis), that the cause of phthisis is an ulcer of the lung, because the symptoms precede the ulceration, and therefore are due not to this but to the tubercles. He compares phthisis and scrofula (écrouelles): phthisis beginning with tubercles or tumors in the lung, scrofula with tumors in the neck. In both cases the tubercles or tumors become inflamed and suppurate. Both diseases in the stage of suppuration are contagious. He believed that the contagion, as in venereal disease, depends on the presence of "worms" (for which we have now substituted microorganisms). As to the doctrine of "Phthisis ab Haemoptoe," held by Morton and most others, he says that this chapter in Morton's book should have been headed "Haemoptoe a Phthisi," hemorrhage being the result, not the cause. Young people between eighteen and thirty-five are most liable, but other ages are by no means exempt. The subjects of phthisis for the most part are: (1) those with contracted alar chests; (2) those with a phthisical parentage and hereditary disposition; (3) those exposed to contagion.

Desault was an enthusiastic supporter of Sydenham's treatment by horse exercise.

Cullen did not favor the contagious origin of the disease.

William Stark, who died at the early age of twenty-nine, wrote an excellent work on the morbid anatomy of phthisis. Though familiar with miliary tubercles he does not use that term. He traced the development of vomicæ from tubercle and their communication with the air

passages. The upper and posterior parts of the lung are first and most affected. He was the first to describe an aneurysm of the pulmonary artery; it measured 1 inch by $\frac{1}{3}$ inch, and opened into a vomica "through a slit on one side of it." The patient died of hemoptysis.

Matthew Baillie, at the end of the eighteenth century, gave an admirable description of tubercles in the lungs: he believed that they arise in the cellular tissue and are not glandular, "as no glands exist in the lungs, while on the inside of branches of the trachea, where there are follicles, tubercles have never been seen."

The great work of Bayle, in the early part of the nineteenth century, opened a new era in the study of phthisis. The smallest tubercles he called "miliary." His criterion for tubercle was an opaque or cheesy substance. In addition he described certain "transparent, hard, miliary nodules," which he called miliary granulations, distinguished from miliary tubercles in that they never became opaque or cheesy; and he regarded them as of the nature of cartilage. The simultaneous appearance of tubercles in various organs of the body convinced him that this dissemination was due to an individual predisposition to a tuberculous diathesis. It is also to him that we owe the term tuberculosis.

The notion of a tuberculous diathesis prevailed for fifty years after Bayle's death. Meanwhile, Laënnec had proclaimed the doctrine of the unity of phthisis: "All phthisis is tuberculous." He linked up the "isolated particles, and the infiltrations of tuberculous matter" (the miliary tubercles and Bayle's granulations) by "transitional forms," which clearly showed that the difference between them was merely that between the green fruit and the ripe. Inflammation plays no part in their production, which may develop in any organ of the body; they are to be regarded as new formations. Scrofulous glands are also tuberculous. Tubercle, wherever situated is connected with a certain disposition, but "the real cause, like that of all diseases, is probably out of our reach." On the other hand, Broussais regarded tubercle as the result of irritation and inflammation.

Andral too denied that tubercle is a new formation. The common causes of phthisis are for him pneumonia, pleurisy, catarrh, or hemoptysis, occurring in persons with a tuberculous diathesis.

Louis gave strong support to Laënnec's views.

Rokitansky's theory was "some blood change depending on hyperinæmia." In England, too, Laënnec's doctrine in the main was generally adopted.

About the middle of the last century the microscope began to be employed by Lebert, Reinhardt and others.

William Addison thought that tubercle consists of epithelial cells derived from the white corpuscles of the blood. Virchow, in his great work, *Die Krankheiten des Menschen*, revolutionized the whole doctrine of tuberculosis. Miliary tubercle is the only criterion. Caseation, though a common change in tubercles is not a specific process; it is a necrobiosis allied to other forms of degeneration. In "pulmonary" phthisis inflammation is the chief factor; tubercle plays a subordinate part. Tubercle is a heteroplastic lymphoma; its seat is the connective tissues of the body.

Scrofula is not a specific disease, but a manifestation of a general vulnerability of tissue and of a proclivity to disease. Heredity is a potent factor, but that which is inherited is not the disease itself, but only a certain disposition or vulnerability. Niemeyer applied Virchow's views clinically, and divided phthisis into two groups: miliary tuberculosis and chronic caseous pneumonia. Any form of pneumonia may terminate in phthisis, but in most cases it is a chronic catarrhal pneumonia which leads to caseation and excavation. Hemoptysis may set up a caseating pneumonia. Miliary tuberculosis is seldom a primary affection in the lung, but generally secondary to ulcerative pneumonia or to a caseous lymphatic gland. Phthisis is not a specific disease, and is not hereditary. A congenital vulnerability and a tendency to a luxuriant growth of cells are the distinguishing marks; and in this sense there is a connection between phthisis and scrofula. His views found favor in Germany; but in France and England the great majority of physicians held firmly to Laënnec's "unity of phthisis."

In 1857, Buhl made the important statement that generalized miliary tuberculosis is an infection of the blood from some caseous lymphatic gland, anywhere in the body. Seven years later Villemin published as the outcome of his memorable experiments on the production of tuberculosis in animals—that tuberculosis is a specific inoculable disease comparable with virulent maladies like small-pox, syphilis, and glanders. In 1867, William Budd, basing his opinion on geographical and epidemiological considerations, declared that phthisis is a zymotic disease like typhoid fever and that its propagation is determined by infection. All doubts were removed by Koch's announcement, in 1882, of his discovery of the tubercle bacillus. Koch's exacting bacteriological technic, and the certainty which it ensures need no recapitulation. Next to him we owe most to the genius of Laënnec, who conceived the doctrine of the "unity of phthisis," and to Villemin, who supplied the first experimental proof of it.

The old terms "consumption" and "phthisis" began to pass out of use and "tuberculosis" was generally adopted. In Koch's opinion the main, if not the only, source of pulmonary tuberculosis is the inhalation of tuberculous sputum, as Villemin had anticipated. The aërogenic origin of the disease has been disputed, but the rival view which regards pulmonary tuberculosis as enterogenic has received less support. As to the relation of human to bovine tuberculosis, Villemin concluded that the two diseases were different. But Klebs and later workers regarded them as identical until 1900, when Koch declared that further experiments had convinced him that human and bovine tuberculosis are distinct diseases and that pulmonary tuberculosis is invariably due to infection by bacilli of human origin. In 1903, Behring advanced the opinion that infection of infants by the milk of tuberculous cows is the chief source of pulmonary tuberculosis. But further investigation has confirmed the correctness of Koch's final conclusion.

Records of autopsies at hospitals show that in a large percentage of all dead bodies—70 to 90 per cent.—arrested tuberculous lesions are found in the lungs or other organs. Man is evidently more resistant to tuber-

culosis than various laboratory animals, though less so than the guinea-pig, cat, dog, sheep, horse and ass. Koch pointed out that in the human subject a temporary immunity is often manifested, periods of partial or apparently complete recovery alternating with phases of active infection. There seem to be intermediate grades of immunity in man contrasting with the complete immunity of certain animals. By analogy we may infer that these different grades of immunity depend on defensive arrangements which are similar in kind and vary only in degree. We can hardly doubt that the explanation of these differences is to be found in biochemical variations at present imperfectly understood, and that hereditary disposition may be explained on similar lines. This illustrates the importance of the part played by the "soil." Villemin had insisted on the interdependence of two factors in tuberculosis—the virus and the *milieu organique*. A further study of the soil is the most pressing need for the successful study of immunity. In the recent, still inconclusive controversies concerning the relative importance of phagocytosis and of the chemical action of the body fluids we witness a renewal of the old contest between the cellular and humoral pathologists.

For prevention, great results were anticipated from Koch's discovery. But so far the results have been disappointing. The death-rate from phthisis had been steadily falling for a number of years before the discovery of the tubercle bacillus, and no accelerated reduction has taken place in recent years. Furthermore, since the great War began in 1914, there has been a steady rise in the mortality. Indirectly we owe to that calamity the latest and most prominent contribution to the problem of phthisis, Brownlee's epidemiological inquiry into its distribution in time and in space—an amount of which concludes Kidd's Harveian Oration.

The unsolved problem is no longer the pathology of phthisis but its cure. We have outlived the worst terrors of the bacillus, to recognize that the soil has the making of them. And yet we still fail to draw the practical conclusion that the soil has to be cultivated by irrigating it with pure blood made bacillus-proof by the *vis medicatrix* of Nature's curative foods.

Hilus Tuberculosis in the Adult. Clive Riviere⁴ regards this type of the disease, strangely overlooked by clinicians in spite of its description in 1911 by Philippi of Davos, and of Straub and Otten's paper in 1912, as one of considerable frequency. When a patient, obviously "consumptive," presents no audible crepitations, and yet a radiogram shows advanced active disease, we must be dealing with mischief originating in the depth which has not yet reached the surface; and is probably due to a reopening of infective foci of childhood thence spreading outward by peribronchial infection.

1. Its bilateral nature is the first of its contrast with apical phthisis. Wherever the signs may appear on the surface, the central disease is practically always bilateral, though stress may fall for a time more heavily on one or the other lung. Generally evident to radiological

⁴ Lancet, February 8, 1919.

examinations, it reveals itself clinically in two directions: the movement of the two sides is usually equal or nearly so; and there is marked retraction of both apices (Krönig's area) to topographical percussion (Figs. 3 and 4). The double apical retraction distinguishes it from apex phthisis on the one hand and from the chest of health, or of chronic bronchitis on the other; these being the three conditions under which error most commonly arises. Riviere gives the following illustrative case. Patient, aged twenty-four years, with a history of six months' cough and wasting, night-sweats, dyspnea on exertion and poor appetite. Pulse, 128. Temperature, 102° F. Chest: Reflex bands of impairment are present over the backs (Fig. 1). Movement is equal on the two sides. Percussion finds no impairment at the apex, but there is double paravertebral dulness and the apical resonance (Krönig's isthmus) is narrowed to 2 cm. on both sides (normal $4\frac{1}{2}$ to 5 cm.). There are no crepitations nor

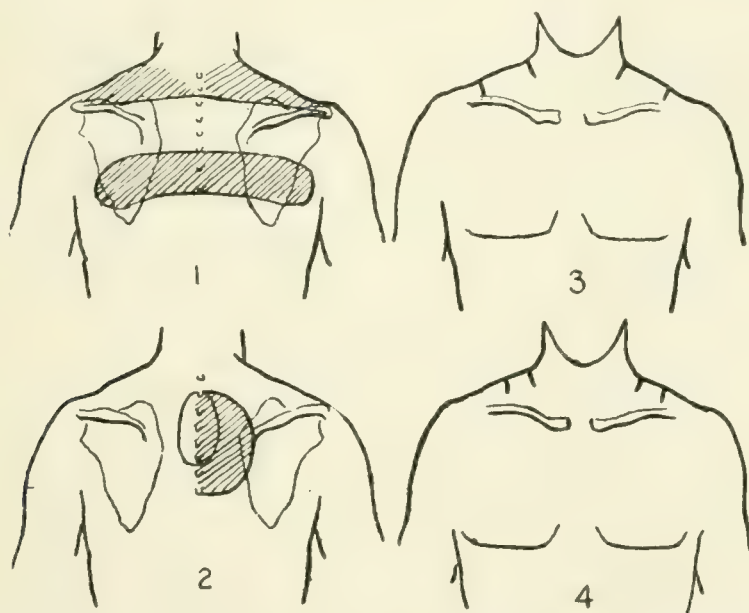


FIG. 1.—Reflex bands of impairment.
FIG. 2.—Paravertebral dulness.

FIGS. 3 and 4.—“Krönig's isthmus”
of apical resonance, normal and reduced.

rales; the breath sounds are normal, and the air entry fairly good. A radiogram shows “disseminated tubercle of fluffy character (alveolar)” through both lungs. On the left side almost the whole field is filled and there is cavitation just outside the root; on the right the disease involves, in the main, the upper half of the lung. The root shadows are very heavy and suggest glandular involvement. Six weeks later the signs are similar, but a few crepitations have appeared at the left base behind.

2. *The Atypical Location of Surface Signs.* Just as in pulmonary tuberculosis of the young child (always a hilus tuberculosis save where a miliary dissemination has occurred) the stethoscopic signs may appear at any point on the chest wall, and no spot is truly characteristic. In hilus tuberculosis of the adult, when the smouldering disease reaches the surface, it does so at some spot other than the apex of the lung, often in the axilla, not infrequently at the base behind. But as the infection

spreads out from the root fanwise it will not be far from the surface at other points also.

3. The characteristic spread of stethoscopic signs to the surface is liable to occur with greater rapidity on one side, front and back, often within a few weeks. Thus it is not uncommon to find clinically a unilateral tuberculosis involving the whole or the greater part of one lung. But a radiogram will reveal disease of little less extent throughout the other lung also. Signs will soon appear and spread rapidly. Even before crepitations are heard the patient may be dyspneic and cyanosed from the abundance of deep-seated disease.

THE SYMPTOMS. Those of toxic origin are identical for hilus tuberculosis and apical phthisis. Others occur which are more characteristic of hilus tuberculosis than of apical phthisis. Shortness of breath on exertion is often prominent, due in some cases to widespread peribronchial disease and in others to the emphysema and bronchitis which are occasional complications. Chest pain is also fairly common, often in the central regions of the chest and occasionally in the side in association with the marginal pleurisies which are frequent accompaniments of this disease.

THE PHYSICAL SIGNS. On inspection and palpation the chest movement is equal on the two sides in the early stages. When however the stress of tuberculization or of pleurisy falls more decidedly on one lung (particularly the right), there is of necessity a unilateral limitation of expansion, as in apex phthisis.

Percussion. (1) The reflex bands of impairment over the backs (described by Riviere in a former communication as evidence of active parenchymatous disease) will be present (Fig. 1). (2) There may be a slight difference of note between the two sides of the chest to "contrast percussion," and this is commonly against the right side. (3) Often there is a wide and well-marked area of paravertebral dulness on the right side (Fig. 2), familiar to pediatricists as acknowledged evidence of intrathoracic glandular enlargement mainly affecting the bifurcation glands, causing pressure on the right pulmonary artery and thereby reducing the function and volume of the right lung. This dull area may overstep the normal "oval interspinous dulness" (Fig. 2) between the first and fifth dorsal spines, so as to stretch out some 6 or 7 cm. on one or both sides and to extend down to the sixth or seventh dorsal spine. Parasternal dulness is also sometimes present, though less often than paravertebral, and it generally points to enlargement of lateral tracheal and tracheobronchial glands. Normally there exists some $2\frac{1}{2}$ cm. (1 inch) of impairment on each side of the sternal border, and this may be increased in these cases to 5 or 6 cm. on one or both sides. (4) Most important of all as evidence of deep disease we find a bilateral narrowing of "Kronig's ichthmus" of apical resonance at the top of the shoulder (Figs. 3 and 4). In the average male chest this normally measures $4\frac{1}{2}$ to 5 cm. on each side. In hilus tuberculosis we find it considerably reduced on both sides, very commonly to $2\frac{1}{2}$ cm. This bilateral narrowing shows that, though nothing else can be found at the surface, some central disease exists. A bilateral narrowing is not characteristic of apical

phthisis, save in its later and bilateral stages; the retraction of the isthmus is less marked (often only to $3\frac{1}{2}$ cm.), and in the early stages it is unilateral. (5) In hilus tuberculosis of adults tidal movement at one or both bases may be diminished, or may entirely fail. Loss of tidal movement, in the absence of extensive lung disease, usually indicates adherent pleura, particularly where the loss is on one surface only. Pleurisy is a very frequent complication of hilus tuberculosis, but pleural adhesions are by no means a necessary accompaniment.

Auscultation. In the early stages the surface may be entirely free of stethoscopic signs, though fine friction, with or without pain, may occur incidentally at one or other base or axillary region; or ill defined fine inspiratory sounds perhaps due to atelectasis, or possibly to edema, or lymph stasis, or merely to the pressure of the stethoscope. If the breath sounds are "blowing" at the right apex, as sometimes happens, this may be due to glandular enlargement, and does not necessarily denote pulmonary consolidation.

The radiographic appearances are of three types according to the activity of the process. In the prevalent form of chronic and quiet disease the main point is the abnormal visibility of the whole lung reticulum, strongly shadowed in all its "twigs" right out to the periphery. The appearance may be so "fibrous" that it is hard to believe any activity can be present. Yet, taking it in conjunction with his post-mortem experience Riviere is convinced that a simultaneous "sowing" of disease over a wide area occurs not infrequently, though the gradual outward spread, which can also be proved to occur, is perhaps the rule. More active disease shows itself in a more woolly and less sharp-cut appearance though still purely "peribronchial." The thickening of the bronchi is more marked, both round the root and farther out in the lung with a nodular or even "budding" tendency. Active and acute disease is well illustrated by the *x*-ray plate of the case described. The strands of the lung network vanish and the pulmonary fields become filled with woolly bronchopneumonic shadows of smaller or larger size, with eventual coalescence and cavity formation.

THE DIFFERENTIAL DIAGNOSIS. As equality of movement, and absence of areas of dulness and of stethoscopic signs belong to early hilus tuberculosis they are of no use for its diagnosis. Only after Krönig's isthmus has been carefully mapped and measured, paravertebral and parasternal dulness searched for, and, tidal movement at the bases explored, can early hilus tuberculosis be excluded. The first of these is practically the key to the condition of the central area of the lung. Having thus discovered that the chest is outside the normal, what proof have we that the malady is of tuberculous causation? Often, it must be confessed, very little in the individual case. Hilus tuberculosis may smoulder for years without any very characteristic symptoms, and tubercle bacilli may be absent from the sputum almost throughout its course. Where the only definite sign is a double narrowing of Krönig's area, as a healed childhood infection does not leave any such behind, we have evidence of a central lung lesion but none of its activity, and still less of its tuberculous causation. We must look elsewhere—mainly

to symptoms—unless tubercle bacilli should eventually be discovered. Our position is little worse than for the diagnosis of apical phthisis in the absence of bacillary sputum, a mere probability of a high degree.

For, failing this explanation, there must exist a disease, presumably a peribronchitis of chronic course, the pathology of which is still unknown. The differentiation from apical phthisis is, as a rule, simple and straightforward, particularly in its early stages. With the advance of disease the two conditions may become atypical, difficult or even impossible to separate.

Variation in Type. Apart from any such borderland cases, we should bear in mind provisionally the following variations in type.

1. *Hilus Tuberculosis Associated with Bronchitis.* Many chronic "peribronchial" cases with recurring attacks of bronchial catarrh, or of cough and expectoration, are in all probability of this origin. Hilus tuberculosis may, indeed, present all the symptoms and many of the signs of chronic bronchitis, with emphysema, and often with asthmatic attacks. For more definite evidence of central disease we must turn to Krönig's isthmus. When, instead of being enlarged, the isthmus is diminished to $3\frac{1}{2}$ cm., some suspicion of a "simple bronchitis" might still be entertained. But where the reduction is to 3 cm. or $2\frac{1}{2}$ cm. there is decided evidence of central lung disease, which in the absence of a history pointing to dust diseases will probably be hilus tuberculosis. The possibility of tubercle masking under the guise of asthma or chronic bronchitis must always be borne in mind. 2. In hilus tuberculosis, with manifest tuberculosis of glands, cervical, axillary, or others, the "lung condition" is usually a secondary incident, and the chest picture is that of enlarged chest glands. Philippi called particular attention to this class of case, insisting above all on the characteristic parasternal and paravertebral dullness. 3. Hilus tuberculosis of bronchopneumonic type is exemplified in the case narrated at the outset; but this is only one, and a comparatively rare variety of the disease.

Riviere's main conclusion is that, when the proper means are employed for its recognition, hilus tuberculosis will be found to be of widespread distribution, and even perhaps to constitute the most prevalent form of pulmonary tuberculosis in the adult as well as in the child. This appears to us to be too sweeping a proposition. But the issues at stake are of such magnitude that we had no choice, but to set forth in all their essential details the arguments with which he has labored to support it.

The Treatment of Diabetes Complicating Tuberculosis. Among 31,834 cases of tuberculosis, collected from 25 tuberculosis institutions in the United States, there were 101 (about one-third of 1 per cent.) cases of glycosuria, and 51 (about one-sixth of 1 per cent.) cases of diabetes; but Landis and his coworkers believe that some of the cases classed as glycosuria were undoubtedly diabetes and that the percentage of true diabetes was underestimated. Yet, as regards treatment, they are not pessimists. In the past that combination was given an almost

hopeless prognosis, because in most instances the tuberculosis was considered paramount and the diabetes less important. We now know that it is vitally essential to control the diabetes first, as for the tuberculosis so much depends on the ability to take and assimilate a diet of maximum value. Twelve such cases were carefully studied, 1 incipient, 5 moderately advanced, and 6 far advanced. In 7 of them fasting was practised at the start, in 2 for five successive days, in 4 for three successive days; and in 1 for two days; before the urine became sugar-free. In all except one, fast days were ordered at various times during the course of the treatment. In 5 of the 12 cases the urine could be rendered sugar-free on a standard carbohydrate-free diet, plus various additions which included a moderate amount of carbohydrates. One patient, however, could be kept sugar-free only by ultimately resorting to fasting. Nine exhibited amelioration in symptoms, and in 5 of these the physical signs did not change. Landis, Fünk, and Montgomery draw the conclusion that it is possible for such patients to partake of a considerably restricted diet over a period of some weeks, and to still show an increase in weight and strength, a fall in temperature, and a lessening of respiratory symptoms. Rest in bed, rather than exercise, is indicated because of the tuberculosis. Special care is also necessary in order not to increase the fats too rapidly for fear of producing acidosis. The treatment is applicable in the presence of recurring hemoptysis; and in every case unless the patient's pulmonary lesions are manifestly hopeless.

PHYSICAL SIGNS AND METHODS.

Latest Advances in Polygraphic Technic. The mechanical improvement recently introduced by H. L. Flint⁶ cannot fail to materially further its intended purpose of enabling many a busy practitioner to use the method, who was previously debarred from using it. The chief objection to the instrument was the length of time required not only for assembling the instrument, taking the tracing, and then packing it up again, but for measuring out the tracing and arriving at a correct interpretation. To meet that difficulty the technic had to be simplified by (1) the adoption of a box in which the instrument can be carried about fixed ready for use; (2) the use of a wrist splint; (3) the introduction of a modified slide rule for measuring out the tracing.

1. *The New Polygraph Box.* The top and front of the box open on hinges; when shut they are fastened by lock and key. All the parts, including the pens, are kept in position for use. All that is wanted is to lift the machine and fill the pens before taking a tracing.

2. *The Wrist Splint.* This obviates any movement of the patient's wrist, resulting in the radial pen being thrown off the paper and spoiling the tracing. The wrist is fixed in a position of hyperextension and the radial artery thrown into prominence. The ordinary wrist piece is strapped into position round the splint, and the forearm then rests on the operator's knee. The radial pen will write perfectly straight on the

⁶ Lancet, February 1, 1919.

paper, and it is possible to keep it quite close to the edge of the paper without any fear of the pen moving off; in fact, the patient can move the forearm without altering the position of the pen. The splint can be applied to either the right or left wrist. A glycerine tambour elbow-piece for recording the brachial pulse instead of the radial, first used in Germany and introduced into this country by T. Lewis hardly gives so good a tracing as the old wrist-piece. The ordinary method of measuring out a tracing with a pair of compasses wastes time and labor.

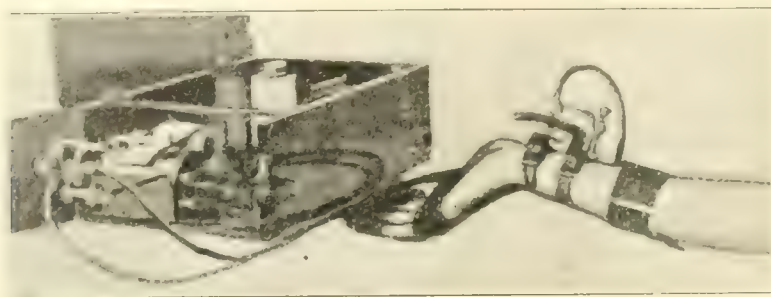


FIG. 5.—The polygraph in position of use and the wrist splint.

3. *The Modified Slide Rule for Measuring Tracings.* The new slide rule consists of a piece of polished wood with grooved sides to carry a slide. The slide has a window which is partially filled with a thin sheet of celluloid, and a space is left between the celluloid sheet and the ends of the frame of the slide, so that the waves can be marked on the tracing with a pencil. Fig. 6 shows a part of the slide rule, with a tracing fixed in position. The tracing is fixed at each end of the slide rule by drawing pins. The slide is then slipped on and moved until the sheet of celluloid lies over the ordinates. The ordinates of both the radial and venous curves are then traced on to the celluloid. These two ordinates are marked by a cross at their upper end. A line $\frac{1}{10}$ second to the left of,

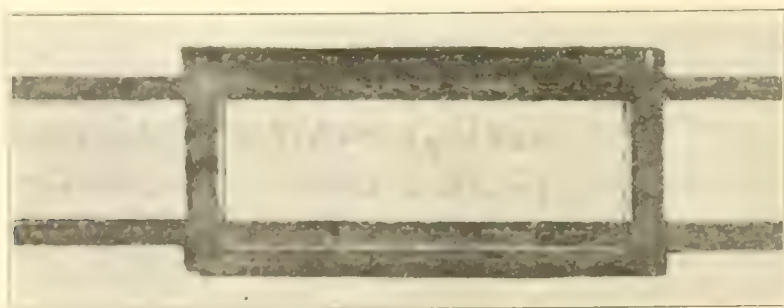


FIG. 6

and parallel to, the ordinate of the venous tracing is now marked in, C, and gives the position of the beginning of the carotid wave, when the radial ordinate is at the beginning of the rise of any one of the radial beats. Another ordinate, A, $\frac{1}{4}$ second to the left of the carotid ordinate, marks the position of the beginning of the auricular wave. An ordinate, V, $\frac{1}{2}$ second to the right of the carotid ordinate, gives approximately the summit of the V wave. Any of these points can immediately be fixed in any particular part of the tracing by moving the slide along

until the radial ordinate lies at the beginning of the rise of the corresponding radial pulse. Similarly, any two consecutive radial, carotid, or auricular waves can be marked on the celluloid sheet and the spacing rapidly compared throughout the whole tracing by moving the slide over it. Any other of the many measurements that may be necessary can be made in the same way. The most convenient method of marking in these ordinates is to use a copying pencil; but if ink is preferred the best is Arnold's black waterproof drawing ink. When finished with, the ordinates can easily be erased from the celluloid sheet by a damp cloth. The ordinates can be marked in neatly and rapidly by running the pencil along a thick piece of celluloid cut to the segment of a circle described by the pen. The same arc of celluloid will serve for any tracing if the pens are pushed home into their receiver before taking a tracing.

The "Asthmatoid Wheeze" as a Sign of Foreign Body in the Trachea or Bronchi. Chevalier Jackson,⁷ does not claim for his new sign that it is always present; but it occurred in 41 of the 62 cases in which the presence of a foreign body was proved. For instance, a bronchus tightly corked by a smooth plug could not yield it. It is listened for at the mouth, and during expiration. Its characteristic peculiarity is, as the name indicates, its resemblance to the wheezing of asthmatics. The feature which distinguishes it from partial bronchial occlusion due to secretion is that it increases, instead of decreasing, in loudness in proportion to the output of mucus by coughing; while the absence of any "croupy" cough excludes the larynx as a probable site of production. In order not to overlook it, it is necessary to get the patient to expire deeply as though endeavoring to empty his chest completely of air; for often the wheezing becomes first audible toward the finish of that prolonged expiration. The simplicity of the examination is a recommendation. But, by reason of the observation being made at the mouth, it does not supply any ready information as to the site of the impacted foreign body.

Stethoscopy for the Early Diagnosis of Gas Gangrene. Mayberry⁸ reports that stethoscopy is of great value; as before the other physical sign, namely resonance of the muscles on percussion, is available, crepitations can be elicited by increasing and decreasing the presence of the chest piece over the swollen part. Another method is to keep the chest piece steady while palpatory pressure is exerted by the finger in many places around it; but we should bear in mind that as a result of that manipulation the crepitations may cease for a while in the area palpated. It is of course essential to avoid mistaking the sounds produced by gas from those due to the presence of blood-clot, and from those due to friction between the skin or hair and the stethoscope. The detection of these audible crepitations may be of use in two ways: (1) In cases in which they are present the wound should be more freely opened up than would otherwise be done; and if necessary secondary incisions with free transverse division of the deep fascia should be made into the muscle over which the crepitations have been heard. (2) During active operations, when owing to the large number of cases admitted to the clearing stations

⁷ American Journal of the Medical Sciences, November, 1918.

⁸ Journal of the Royal Army Medical Corps, January, 1918.

it is impossible to drain all wounds involving muscular tissue, cases in which crepitations are present should have preference as regards early surgical treatment over those in which they are absent.

Tests of Physical Efficiency for Flying. Col. Martin Flack described his five elementary tests before the Royal Society of Medicine on January 10—namely: (1) The pulse rate at rest, sitting, standing, and after the subject had raised his body weight the height of a chair five times in fifteen seconds, together with the length of time of return to the normal standing rate; (2) the length of time the breath could be held before and after exercise; (3) the measurement of the vital capacity by means of a modified gas meter; (4) the expiratory pressure recorded on a mercury manometer; (5) the length of time the subject could maintain an expiratory pressure of 40 mm. of mercury after full expiration and full inspiration, and the response of the pulse during this effort. Success in these tests, particularly the last, was closely correlated with efficiency as actually displayed by flying officers. Officers judged on quite other grounds, whether military or medical, to be good pilots pass the tests well; while the great majority of failures would have been definitely rejected by the tests. The tests reveal some cause of ill success, the exact nature of which needs clinical identification in individuals. With suitable modifications of standards, they might have a field of usefulness wider than the air force, and be applied in connection with studies of physical efficiency and fatigue in industry as well as in school clinics. G. Henderson's exhaustive report in the *Journal of the American Medical Association* cannot be reviewed for want of space.

THE THORAX AND THE PLEURA.

A Pneumothorax Paradox. It is an undisputed fact that immobilizing a badly damaged lung leads to an early relief of the dyspnea, instead of aggravating it. In both the cases instanced by F. C. Coley,⁹ the disease was in the left lung. His explanation of the paradox is that the dyspnea in phthisis is not mainly mechanical, in proportion to the amount of disabled lung tissue, but mainly toxic. In pneumonia this has been generally recognized by clinicians: a patch of consolidation may produce a degree of dyspnea quite out of proportion to its extent; and conversely when the crisis takes place the dyspnea quickly abates, although the physical signs demonstrate that a large part of the lung is not yet capable of functioning. That an artificial pneumothorax does have the effect of reducing the output of toxins into the blood is proved by the fact that a temperature which had persisted in spite of prolonged rest in bed may drop to normal within a few days. The severity of the dyspnea, which might have been regarded as a contra-indication, is really the condition which the operation is most likely to relieve. Moreover, the more extensive the disease in the lung which we propose to compress, the less will be the strain of extra work thrown by the pneumothorax upon the other lung.

⁹ British Medical Journal, March 15, 1919.

Nevertheless that explanation is hardly complete without some mechanical physiological considerations, which we may venture to add to it, both pulmonary and cardiac. Although in unilateral cases the sound lung is relatively enlarged, it has to work in harness with its crippled fellow which hinders the full action both of its ribs and of its diaphragm. These are released by the one-sided immobilization. The resulting advantage is clearly much greater in cases of left disease because of the greater size of the right lung. It is true that the heart, if free from adhesions, will claim at first some of the right thoracic space under pressure of the pneumothorax; but less and less of it with every hour, owing to the steady reabsorption of air by the pleura. Again, while it is easier for the heart to migrate leftward than to the right, the gradual alveolar atelectasis of the compressed lung (which cannot be instantaneously achieved) will for some time be yielding more and more available left space for the heart, greatly to its relief, and to the advantage of right pulmonary expansion. A great deal of the dyspnea of phthisis is due to the cardiac weakness brought about pathologically by toxic malnutrition, and physiologically by the absence of deep breathing, and of muscular exercise. Anatomically the immediate effect of pneumothorax is to greatly diminish the blood transit through the compressed lung, thereby suddenly raising the right intracardiac pressure. That sudden heart stress may probably account for a good many instances of so-called "pleural shock," as a complete capillary compensatory dilatation within the sound lung, cannot be instantaneously achieved. Usually, however, the powerful right-heart stimulation is sufficient. It whips up the depressed action of the whole heart, and starts it upon its sustained course of progressive training into strength. In short, the paradox might be best explained as a "joint effect" of the abrupt reduction in the blood's circulatory area, and of the gradual reduction of the blood contamination by toxins.

A Case of Double Artificial Pneumothorax. Archie McCallum¹⁰ prefaces his remarkable case with the statement that one lung may be greatly collapsed with little or no embarrassment to respiration. Through a fluoroscope the lung can be seen to undergo a limited respiratory movement, even under a positive gas-pressure it does not entirely cease to function. He was, however, not a little surprised to find a patient breathing quite comfortably and moving about the grounds of the institution with no embarrassment, in whom, in the routine treatment, he had produced a double pneumothorax of some considerable size, through a patency existing between the right and left pleural spaces. The right lung was extensively involved, the left lung free from active lesions. The first 4 introductions of nitrogen averaged about 250 cm. each time. These probably went into pockets between adhesions. At the fifth, a definite pocket of gas between the base of the lung and the diaphragm was discernible through the fluoroscope after injecting 450 c.c. After the eighth treatment the area above the diaphragm on the left side showed a slight transparency with the fluoroscope. But

¹⁰ British Medical Journal, March 15, 1919.

after the ninth, a very distinct pneumothorax was seen on both right and left sides, lifting the bases of both lungs away from the diaphragm. The highest part of the bases of the lungs was at the level of the fourth intercostal space in the midclavicular line. The patient said he was "a little short of breath," and felt that he "had gas on the stomach," but, as stated before, being an "up" patient, he continued to walk about the grounds with little discomfort. It was obvious that a continuance of the artificial pneumothorax was inadvisable; and the next day the gas was withdrawn, namely 1325 c.c., with a fall of pressure from +12 to -2. The operation was then discontinued; but, as is shown in the *x*-ray plate, a considerable quantity of gas still remained on the right side. The gas had been withdrawn at the site of its introduction, viz., the eighth intercostal space in the anterior axillary line on the right side. A patency between the right and left pleural spaces had been previously indicated by the fluoroscopy; but a study of the two *x*-ray plates (before and after the withdrawal) yielded further information. The extent of the involvement of the right lung was shown by the mottling of the organ. The adhesions in both lungs were well marked, and probably accounted for the marked depression of the diaphragm on both sides. Even after withdrawal of the gas, the left lung still showed a triangular transparent area indicating some retention of gas. Besides the physiological considerations suggested by this case, and the anatomical peculiarity of a patency between the pleural spaces (presumably the result of a tuberculous focus perforating the "partition" between the spaces) it teaches us a therapeutical lesson, that of the indispensability of fluoroscopy and of skiagraphy for a safe performance of artificial pneumothorax, if the danger of compressing the healthy lung at the same time as the diseased one is to be avoided.

The Dangers of Artificial Pneumothorax have been much reduced by increasing care in manometric observation, and by refraining from larger inflations than 300 c.c. at the first sitting. B. Stivelman¹¹ believes that urgent symptoms occurring either during the inflation or during the anesthetization of the parietal pleura, are most often due to "pleural shock." Air embolism is the most dreaded of all; but its genuine occurrence has not been proved conclusively and has been seldom reported. Forlanini observed it 4 times only in 10,000 inflations, with 2 fatal results. Brauer recorded one death from the entrance of 15 c.c. of N. gas into a punctured vein; but at the autopsy that diagnosis could not be confirmed experimentally. On the other hand, Forlanini introduced from 2 to 3 c.c. of N into the carotid artery of a dog, and from 6 to 8 c.c. into the left ventricle of another, with no ill-effects. Granting that the aspirated air would expand when subjected to a negative pressure and higher temperature, it is doubtful whether the coefficient of expansion would create a volume of gas sufficient to cause symptoms of embolism. Woodcock is inclined to the opinion that the escape of alveolar air is not often a source of danger. Moynihan asserts that no deaths have occurred in the base hospitals from injection of gas into the tissues.

¹¹ New York Medical Journal, February 1, 1919.

Furthermore, since gunshot and stab wounds of the chest and fractured ribs are very rarely followed by air embolism, it is reasonable to suppose that air escaping from ruptured alveoli is not a potent factor in producing air embolism. Riviere and Simon agree that air embolism symptoms are usually indistinguishable from those caused by pleural shock. Although sudden death from this cause is possible, experimental investigation has not been confirmatory; and, clinically, symptoms of embolism have been observed most frequently in cases where no air could possibly have entered a punctured vein. Shock or collapse in such cases must therefore be attributed to other causes, *viz.*, cocaine poisoning, puncture of the heart, spontaneous pneumothorax, or pleural shock. Extreme idiosyncrasy to cocaine is exceedingly rare; and inasmuch as shock during the operation occurs as frequently during attempts at refilling as at the initial operation, it is evident that cocaine is rarely, if ever, responsible for this accident.

Injury of the heart or puncture of the ventricle is of rare occurrence. In fibroid cases where the heart is markedly displaced, this has happened. Minor had such a case; Stivelman reports one of his own which recovered slowly and was out of bed on the sixth day. Spontaneous pneumothorax is an infrequent complication of the operation itself, though regarded by Parry Morgan and Fishberg as less so than generally believed. Marshak and Craighead have collected 37 cases to date; and they find that the symptoms occur in the majority of instances many hours, and even days, after the last inflation. It is also worthy of note that spontaneous pneumothorax in the tuberculous occurs more often when no attempt at artificial pneumothorax is made than when artificial collapse of the lung is resorted to. In 1122 cases reported by 24 American observers, spontaneous pneumothorax is mentioned as a complication but 12 times, which is a little more than 1 per cent., while its frequency in cases not operated is as follows: Weil, 10 per cent.; West, 5 per cent. of fatal cases; Drasche, 198 cases out of 10,212 of pulmonary tuberculosis or 1.93 per cent.; Fishberg, about 4 per cent.; Powell and Hartley, 6 per cent. of fatal cases at Brompton Hospital. Thus spontaneous pneumothorax following the introduction of either the anesthetizing or pneumothorax needle is rare.

Pleural Shock is one of the most frequent accidents complicating the operation; the symptom-complex, also known as "pleural reflex or pleural eclampsia," is often mistaken for slight air embolism, or in its milder form for a fainting spell. It is the next most frequent complication to pleural effusion. In Stivelman's experience, it occurred 3 times, twice in one patient. Its mechanism of production has not, as yet, been well defined. Simon attributes it to the introduction of air below body temperature; but as a fact, pleural shock makes its appearance most frequently before the inflation is begun. Saugman suggests that blunt instruments may cause it; but, clinically, it appears most frequently when sharp instruments are used. Riviere states that it has been proved in animals that mechanical irritation will not cause it, while the introduction of certain chemicals such as phenol, alcohol, acetic acid, into the pleural cavity will be followed by symptoms. Russel traces it to

"afferent impulses conveyed to the medulla along the distribution of the vagus nerve whose terminal fibers, rendered unduly sensitive by compression of inflammation, are irritated by the needle;" while others claim that it occurs most frequently in early cases where the pleura is not much affected. Anesthesia of the needle tract through the skin-underlying tissue and pleura is urged by some authors as a preventive of this complication; and yet this incident was absent in groups of cases (145 and 74) treated without any anesthesia; and the cases of pleural shock observed by many authors followed careful anesthetization of the pleura.

As to the symptoms: In mild cases nothing but slight inconvenience, such as short fainting spells may be experienced. In moderately severe cases, however, the circulatory, respiratory and nervous systems both motor and sensory are usually involved. The pulse, previously normal, may become rapid, feeble and irregular, and sometimes even imperceptible; the apex beat, faint and irregular, usually with dizziness, marked cyanosis and dyspnea, or shallow, stertorous breathing. Rigidity of a part of the body musculature, ordinarily of the upper extremities and neck, any clonic contractions are frequently seen. There may be temporary motor aphasia, amblyopia, sensory aphasia and unconsciousness. All these symptoms are said to be caused by spasm of the cerebral and cardiac vessels. In a typical case which he describes, after a hypodermic injection of $\frac{1}{4}$ grain of morphine, the skin and pleura at the fourth interspace were anesthetized with $1\frac{1}{2}$ c.c. of a $\frac{3}{4}$ per cent. solution of cocaine, and 1 in 8000 adrenalin. But before the needle was withdrawn the patient collapsed and expressed a desire to vomit, pulse became rapid and almost imperceptible, with pallor, stertorous breathing, slight rigidity of the right arm, agonizing pain in the region of the heart and marked photophobia. Stimulation was quickly given, and in about half an hour the patient was quite comfortable and a few hours later had completely recovered. Two days later a similar attempt resulted in profound shock immediately after the pleura was anesthetized and the needle withdrawn, with agonizing pain in the region of the heart, pulse imperceptible, heart-beat very rapid, weak and distant, respiration stertorous, face markedly cyanotic, marked rigidity of the left arm and both lower extremities, pain also extending over forehead, speech incoördinate, and temporary unconsciousness. After stimulation by hot coffee per rectum, and by strychnin hypodermically, the pulse became perceptible but somewhat irregular. Immediately after consciousness returned patient complained of complete blindness for a while. The muscular rigidity subsided when unconsciousness came on; the photophobia persisted for about twenty-four hours. Two days later the patient had completely recovered from the effects of shock. No further attempts were made in this case.

The Etiology of Rachitis. Deaths from rickets are almost exclusively due to respiratory affections resulting from the damage inflicted upon the structure of the thorax and its mechanisms and upon the intrathoracic functions. The organic damage from rickets is primarily thoracic and pulmonary, influencing the heart and the entire economy

in a secondary degree. Its widespread prevalence constitutes an important element in individual physical unfitness, and also perhaps, though evidence is still lacking as to any "transmissible" rachitic diathesis, in racial degeneracy. In the West of Ireland, where the death-rate is only 30 per 1000, rickets is an unknown disease; whereas, in poor urban districts of this country where rickets is rife, the death-rate in children varies from 100 to 300 per 1000. Thus there may be some relation between rickets and the enormous death-rate of towns, even although the disease in itself does not kill. Edward Mellanby's¹² experimental work on puppies shows that the rachitic condition need not be at all advanced before the animal's whole behavior is transformed. It becomes lethargic, is far more liable to be affected by distemper and bronchopneumonia, and is very susceptible to mange. That low resistance is impressive. Sir John Bland-Sutton's investigation in lion cubs (anterior in date to the theory of vitamins) appeared to trace the cause to a deficient supply or utilization of fats. Subsequently Findlay's observations on 12 puppies fed on oatmeal porridge and milk (amounts not stated) made out a plausible case for von Hansemann's "theory of domestication" which contemplates all the unhygienic influences of life in civilized and crowded communities. E. Mellanby's laborious research, conducted on 200 puppies lead him to regard the affection as a deficiency disease analogous to beriberi (and also to scurvy, the etiology of which has received an important contribution from Harriet Chick and Mabel Rhodes's investigation of "the antiscorbutic value of the raw juices of the root vegetables, with a view to their adoption as an adjunct to the dietary of infants."¹³) a conclusion well supported by the researches of May Mellanby,¹⁴ his wife, into "the action of the accessory food factors on the development of teeth."

As this is probably the first research on growth factors carried out on dogs, it might be expected that the facts would not be identical with those met with in rats. Moreover, we know something of the part played by accessory food factors in beriberi and scurvy, and we know something of the part played by these substances in growth: but in rickets we have apparently a combination of both a deficiency disease and growth; rickets being in fact a disease accompanying growth. Whether the antirachitic factor is fat-soluble A, as previously understood, is therefore undecided; but, on the whole, these substances appear to be identical. It is at least certain that the distribution of the two substances is remarkably similar. A long series of experiments was first undertaken to critically overhaul the evidence adduced in support of the "domestication theory" of von Hansemann. The subsequent ones were devoted to a demonstration that the dietetic changes are of prime importance in bringing about the widespread development of rickets, although, according to the researches here described, diet must be considered from an entirely new point of view.

The methods which Mellanby employed for a clear identification of the rachitic process consisted in (1) *x*-ray examination of the bones;

¹² *Lancet*, March 15, 1919.

¹³ *Ibid.*, December 7, 1918.

¹⁴ *Ibid.*, December 7, 1918.

(2) calcium estimation of the bones after death; (3) histological preparations of the bones. The first step toward tracing the beneficial influence of some "antirachitic agent" in diet was to construct dietaries which never failed to produce rickets, namely the following "rachitic" diets:

Diet I. Whole milk $\frac{1}{5}$ c.c.—oatmeal, rice—NaCl 1–2 g.

Diet II. Whole milk $\frac{1}{5}$ c.c.—bread ad lib.

Diet III. Separated milk $1\frac{1}{5}$ c.c.—bread (70 p. c. wheaten) ad lib.—linseed oil 10 c.c.—yeast 5 gm.—NaCl 1–2 gm.

Diet IV. Separated milk 250–350 c.c.—bread (70 p. c. wheaten) ad lib.—linseed oil 5–15 c.c.—yeast 5–10 gm.—orange juice 3 c.c.—NaCl 1–2 gm.

Modifications of these diets were carried out, namely in order: (1) To ensure a more rapid development of rickets; (2) to be compatible with better health and better rate of growth, for the better the animal grows on a rachitic diet the more easily is its rickets produced; or rather, the more difficult it is to stop.

Using Diet I, the increase of whole milk from 175 to 500 c.c. per diem prevents the development of rickets. On Diet II, not only does meat, but both the watery and alcoholic (80 per cent.) extracts have an inhibitory effect. On the other hand, the protein residue after loss of extractives allows rickets to develop. The addition of malt extract and yeast to Diet II therefore shows that yeast has no protective influence. Malt extract has some inhibitory action and delays the onset of rickets when added to Diet II. Many fats and margarines, animal and vegetable, were tested. They almost uniformly prevented rickets, the only undoubted exception being linseed oil. But, by means of the calcium results, it was discovered that the action of the fats was graded, the animal fats being more antirachitic than the vegetable fats, and the latter differing from each other greatly. The best of the vegetable fats in preventing rickets are arachis (peanut) and olive oils. The worst of those examined include linseed, cottonseed, babassu oils, a hydrogenated fat, and cocoanut oil.

Regarding it as a deficiency disease, of the three factors known (fat-soluble A, water-soluble B, and antiscorbutic), two can be excluded. As yeast has no preventive influence, water-soluble B. cannot be considered as of importance. Again, orange juice, sufficient to exclude any possibility of scurvy when considered with the rest of the diet, did not inhibit the disease. This therefore allows the exclusion of the antiscorbutic factor. On the other hand, the antirachitic substances for the most part have been found to be similar to those in which, according to the experiments on growth of McCollum, Osborne, Mendel, and others, fat-soluble A is present. It therefore seems probable that the cause of rickets is a diminished intake of some "antirachitic factor," which is either fat-soluble A, or has a somewhat similar distribution to that of fat-soluble A. Yet the facts are not all in favor of this hypothesis as it stands. There are several points not in harmony with the ordinarily accepted views about fat-soluble A; and three of these are discussed.

A. rickets develops best in rapidly growing animals, and the larger and more rapidly growing children most often suffer from rickets, whereas

marasmic children generally escape, it is difficult to associate a disease of rapid growth with a deficiency of fat-soluble A which is, according to accepted teaching, "necessary" for growth. The first point to emphasize is that some of the fastest growing dogs in these experiments had had very little fat-soluble A in their diet. This raises a question as to the necessity of fat-soluble A being present in the diet before growth is possible. It can be definitely stated, according to Mellanby, that the amount of growth a puppy experiences has no strict relation to the amount of fat-soluble A in the diet, although a small minimum amount may be necessary; and that the function of fat-soluble A is not so much to ensure growth as to keep the growth straight. The greater the amount of growth in any period, the greater is the amount of fat-soluble A necessary to keep it along normal lines.

THE ACTION OF MEAT AND MEAT EXTRACTS. Although when added to Diet II these substances prevent rickets, in the case of Diet III rickets develop. Yet even in the Diet III and IV experiments, the action of meat is undoubtedly inhibitory in nature and, when 50 gm. of meat are given, will almost prevent rickets in a small puppy. Meat has a stimulating action on the growth of puppies far beyond its fat-soluble A content. Likewise, too, the antirachitic action of meat is in a greater measure than any fat-soluble A it is reputed to contain. Meat has a stronger effect on metabolism than any other foodstuff, a special dynamic action in stimulating the total chemical exchanges in the body. It will increase the effectiveness of any fat-soluble A in the diet and will tend to lessen its storing up and deposition in the subcutaneous and other tissues. Again, any fat-soluble A in the tissues will be more readily mobilized. The antirachitic action of meat may therefore be rather due to its increasing the effectiveness of any fat-soluble A present in the body, than to the fat-soluble A it possesses in itself. Thus it might still be possible to regard fat-soluble A and the antirachitic factor as identical.

THE DIFFERENT EFFECTS OF VEGETABLE OILS. These tell with widely different action on the development of rickets. Previous workers describe all the vegetable fats as deficient in fat-soluble A, with but little differences between them. On the other hand, their antirachitic influence varies considerably, being obviously present in arachis and olive oils and absent in linseed and babassu oils. Other vegetable oils, like cocoanut and cottonseed, occupy an intermediate position. If the antirachitic factor is fat-soluble A, then the type of experiment described in this work is a more delicate test for fat-soluble A than previous work on the growth of rats.

EARLIER ETIOLOGICAL HYPOTHESES. The "accessory factor" hypothesis allows many of these older hypotheses to be focussed into a common and simple image.

1. *Dietetic Hypothesis. Rickets as Due to a Deficiency of Fat.* The experimental work of Bland-Sutton and the clinical efficacy for rachitic children of codliver oil and other fats have caused a general acceptance of the view that rickets is due to deficiency of fat in the diet. The results recorded here make it clear why this view is so commonly held, but demonstrate that the efficacy of the success of treatment—

curative or preventive (as regards the latter the work of Hess and Unger is of particular interest) does not depend on fat *per se*, but rather on the type of fat, and whether it contains an abundance of the antirachitic factor; animal fats being superior to vegetable fats.

2. *Excess of Carbohydrate in the Diet.* This means a diet made up largely of cereals like wheat, rice, and oats, which have undergone transformation in the course of manufacture, and are most deficient in antirachitic factor. That diet therefore is quite unbalanced and most effective in producing rickets.

3. *Deficiency of Fat and Excess of Carbohydrate.* This comprises what is said about the first two hypotheses. Such a combination would most certainly involve a deficiency of antirachitic factor.

4. *Deficiency of Calcium Salts in the Diet.* As stated previously, abundance of calcium, either in the form found in separated milk or in calcium phosphate, will not prevent rickets when the diet is deficient in antirachitic factor. Similarly, some workers have found that a diet deficient only in calcium salts, but otherwise adequate, will not produce rickets. It is, however, more than probable that a deficient calcium intake associated with a deficient antirachitic factor will bring about rickets more acutely, and must always be an adjuvant factor.

5. *The Domestication Theory.* We have not yet complete knowledge as to what is most unhygienic in the environment of civilization. There is something subtle about the problem. Many of the factors about which we hear so much may be of little or no importance when compared with factors about which nothing is yet known. Modern life, and particularly urban life, has involved two main changes: (1) In diet; (2) in greater confinement and lack of fresh air. Findlay's 12 dogs were fed on a diet similar to Diet I which normally produced rickets in experimental puppies. (Diet I was composed of whole milk 175 c.c., oatmeal and rice, and 1-2 gm. NaCl.) On this diet his confined dogs were rachitic; those obtaining exercise, normal. The beneficial effect of freedom in dogs on an inadequate diet is what might be expected, and is not discordant with a dietetic hypothesis.

THE DIETETIC PROBLEM AND THE ROLE OF MILK. It appears from this work that the foodstuffs of an infant ought to contain a maximum amount of antirachitic factor. Since foodstuffs which contain no antirachitic factor cannot be considered as neutral, but are positively rickets-producing and since there is a limit to what a child can eat, the inference is obvious. It is probable that bread is the worst offender. The same statement may apply to other cereals, but this has not been worked out to any extent. Another point of importance is the type and amount of fat eaten by children. They should not be given vegetable margarines or any other vegetable fat. The natural fat for a child is the fat of milk. If additional fat is given to that, then codliver oil is the best. Milk ought to remain the staple article of diet not only until weaning, but for some years later to assure a good supply of antirachitic factor. But McCollum, Simmonds, and Pitz have shown that before an abundance of fat-soluble A appears in the milk, the mother must have a good supply of this substance in her food. This means that the animal power

of synthesizing these accessory food factors is small or absent. Grass is a good source of fat-soluble A for the cow; and a well-fed cow, from this point of view, will give good milk. The mother drinks this milk, and the accessory food factors are passed on to her mammary glands to enable the breast-fed child to get an adequate supply. The problem therefore reverts largely to the feeding of the cow. It is probable that a cow fed in the stall largely on vegetable oil-cakes will give a milk deficient in accessory food factors, which will develop rickets; for it is probable that the same argument applies even if it should subsequently prove that the antirachitic factor and fat-soluble A are not identical. Recently Hess and Unger have shown that the diet of the negro women in New York, whose breast-fed children are nearly always rachitic, is very often deficient in fat, the amount of milk they drink being small. These suggestions may also explain why rickets develop more commonly in the winter months, when the cow's diet is more artificial.

OTHER FOODSTUFFS AND ARTIFICIAL ADJUNCTS. In these days, when proprietary articles are so commonly used for children, it is vital that these preparations should be judged by their accessory food-factor content in addition to the ordinary analysis as to any protein, fat, carbohydrate, and salts they may contain. Synthetic milks, especially if containing linseed and other vegetable oils, ought to be discountenanced unless it can be shown that their accessory food factors are abundant. Similarly, the dispensing of vegetable oils instead of codliver oil to children may do much more harm than good, as in the case which was reported at the meeting of the Physiological Society in January, 1918, in which cream containing linseed oil was given. It would be safer to exclude all vegetable oils from their dietary. The subject is of great importance and will not end with rickets. Recent studies on the action of accessory food factors on the development of teeth point to the necessity that throughout the whole period of calcification of the teeth, *i. e.*, up to the eighteenth year—there should be abundance of antirachitic factor in the diet. Still further points of practical interest are under E. Mellanby's study for early publication.

The Relation of Accessory Food Factors to Healthy Dentition, and to the Prevention and Treatment of Beriberi and Scurvy. It may serve a practical purpose to call attention briefly to the conclusions of several investigations on nutrition recently published in the *Lancet*.¹⁵ May Mellanby's "*Experimental study on the influence of diet on teeth formation*" has yielded the following results: (1) A diet containing in abundance those articles with which the fat-soluble A accessory food factor is associated, *e. g.*, codliver oil, butter, etc.—allows the development in puppies of sound teeth. (2) A diet otherwise adequate but deficient in the substances with which fat-soluble A is associated brings about the following defects in puppies' teeth: (a) Delayed loss of deciduous teeth. (b) Delayed eruption of the permanent dentition; in some cases the delay in the eruption of the permanent teeth is more marked than the delay in the loss of the deciduous teeth. (c) Irregularity in position and overlapping,

¹⁵ *Lancet*, December 7, 1918.

especially of the incisors. (d) Partial absence of or very defective enamel. (e) Low calcium content; the deficiency in calcium salts may result in the teeth being so soft that they can be cut with a scalpel. (3) The evidence makes it clear that this is an instance of diet affecting the teeth from the inside, and is independent of bacterial sepsis and other oral conditions associated with food. (4) These results cannot be considered as being due to acute illness or "malnutrition," for (a) the improvement to the teeth by the addition of fat-soluble A containing substances (animal fats, &c.) is as characteristic as the deleterious effect of a deficient diet; (b) there is evidence that the defective teeth are most pronounced in the rapidly growing puppies, and it is difficult to associate rapid growth with illness or "malnutrition," as generally understood. (5) This work, taken in conjunction with the experiments of E. Mellanby on rickets, puts the close relationship between hypoplastic teeth and rickets on an experimental basis.

Harriet Chick and Mabel Rhodes's "*Investigation of the antiscorbutic value of the raw juices of root vegetables, with a view to their adoption as an adjunct to the dietary of infants*"¹⁶ concludes as follows: (1) Cow's milk possesses distinct antiscorvy properties; but these are present in small degree in comparison with other antiscorbutic foodstuffs. Its value in this respect is further reduced after heating or drying. It is therefore advisable to provide some extra antiscorbutic material in the diet of infants nourished upon heated or dried cow's milk. (2) The antiscorbutic value of various materials that might suitably be included in an infant's diet has been tentatively determined by means of experiments with guinea-pigs. Among fresh fruit juices that of the orange is easily the most suitable and possesses a value about ten times as great as that of fresh grapes. Of the raw vegetable juices examined, raw swede juice proved to be far the most potent, approximating in value to raw orange juice. The raw juice of carrots was found to be much inferior; and that of beet-roots failed to prevent scurvy in the largest dose (20 c.c. daily) that could be administered to the experimental animals.

H. W. Wiltshire's¹⁷ "*Note on the value of germinated beans in the treatment of scurvy; and some points in prophylaxis.*" leads him to the following conclusion. The statement of Dr. Chick and Miss Hume that germinated pulses are richly endowed with antiscorbutic vitamins is amply confirmed by the fact that germinated beans were found quite as potent as raw lemon juice in the treatment of scurvy. Their suggestion that germinated pulses should be used for the prevention of scurvy is capable of practical application, and would be the easiest and cheapest method by which to prevent the occurrence of scurvy in an army in the field. In the case of vegetables cooked in the army manner the destruction of vitamin which takes place cannot be ascribed to the production of alkalinity.

Alice Henderson Smith's¹⁸ "*Beer and Scurvy; some notes from history*" ends with this paragraph—"At its best, under the most favorable conditions, it has never been claimed that beer is a complete protection from

¹⁶ Lancet, December 7, 1918.

¹⁷ *Ibid.*

¹⁷ *Ibid.*, December 14, 1918.

scurvy over any extended period of time; and even in Cook's time his beer and his infusion of malt did not alone confer invulnerability. But (before lemon juice removed the need of it) malt preparations do seem to have given a very considerable measure of protection when methods of malting and brewing were simple. Later, as a nourishing drink, and as a substitute for spirits, beer still had value for the seaman on Arctic service; but with the elaborating and perfecting of malting and brewing processes, the antiscorbutic element seems to have been largely, if not completely, eliminated. Thus the conclusions drawn by Harden and Silva from their recent experiments with beer made from kilned malt is confirmed by the history of its failure in Arctic experience. But Captain Dyke's account confirms and justifies the belief in the beer used by earlier generations in the Navy, 120 years ago."

Sergent's Syndrome of Apical Pleuritis¹⁹ consists of the two factors, most common in phthisis, of supraclavicular adenitis and of pupillary inequality, which he has long studied and taught at La Charité in Paris, as a help in the early diagnosis of pulmonary tuberculosis; in association with diminution of the vocal vibrations, a certain degree of dulness and diminution in the intensity of the respiratory murmur.

The respiration, too, is apt to be jerky, with friction sounds, and frequently with pain in the scapular region or between the two shoulder blades. Radioscopy shows certain modifications. "Apical pleuritis," he takes to mean a slight inflammatory reaction of the apical membrane, without effusion. Anatomically there is a loss of polish, with thickening, which may even go so far as symphysis as a cicatricial termination of the malady. Any irritation may give rise to it, for instance the passage of a bullet, but in the majority of cases Koch's bacillus is the casual agent. The "adenitis" is found in the angle formed by the internal extremity of the clavicle and the sternal head of the sternomastoid muscle. In emaciation the enlarged gland or glands are felt easily, varying in size from that of a lead pellet to that of a hazel-nut. In other cases the patient should relax his muscles by flexing the head and inclining it toward the side which is being explored. In some cases the gland is painful on pressure, and during the stage of active evolution is likely to vary in size and consistency. The adenitis seems to be associated with inflammation of the apical pleura rather than with that of the lung tissue itself.

Pupillary inequality in pulmonary affections has been the subject of study by several authors. According to Sergent, the following cases may be observed: (1) Simple pupillary inequality, without any associated symptoms; (2) myosis, with diminution of the palpebral cleft and retraction of the eyeball, and with or without vasomotor symptoms; (3) mydriasis with vasomotor symptoms. Myosis is due either to excitation of the constrictor (third cranial nerve) or to paralysis of the dilators; in mydriasis the contrary obtains. Having eliminated syphilis as a cause, the question is: "Which is the pupil affected?" As a rule it is the most dilated one, in which the variations in size either to light,

¹⁹ Medical Press, January 1, 1919.

accommodation, sensorisensorial excitations or to the action of certain pharmaceutical agents are weaker and less marked. It is rare for myosis to be observed. In the majority of cases the mydriasis is found on the same side as the lesion. It is a very early sign, sometimes before any stethoscopic signs can be detected. It varies very greatly in degree from day to day. In some cases it appears first on one side and then on the other ("mydriase a bascule"). As a rule, it follows the course of the pleural lesions, appearing when these undergo an active phase and accompanying the friction sound. It may disappear for a long time, reappearing with a revived activity of the lesions. It is of prognostic significance when it persists in spite of an attenuation or even a practical disappearance of the general and stethoscopic signs; then the lesions are merely dormant and will reappear. On the other hand, if it disappears rapidly one may infer that the lesions are only very slight. In conclusion, this sign, so easy to observe when attention has been called to it, guides us, especially when combined with supra-clavicular adenitis, to submit the corresponding apex to a very careful examination.

THE RESPIRATORY FUNCTION.

An Avoidable Cause of Drowning. Inexperienced persons swimming with the wind, and therefore with waves travelling in the same direction faster than it is possible to swim, get the impression of being carried backward in the water and believe themselves caught in an offshore current. In their alarm they needlessly increase their efforts and may become fatally exhausted before reaching a footing. Walter R. Shaw, of the Philippine University, Manila, described in *Science*, July 12, 1918, two instances in able-bodied but indifferent swimmers who, after going out just beyond their depth in an onshore breeze, returned to the bath-house exhausted and reported that they had been caught in an "undertow," with a nearly fatal issue. On numerous subsequent occasions, while initiating beginners in deep-water swimming, he has heard the pupil anxiously declare that there was a current against him. He therefore urges teachers (and writers of text-books) in physics, physiology or physical culture to disseminate among the public a knowledge of this avoidable danger by utilizing the analogy of the similar optical illusion familiar to all who travel by rail. The feeling of being carried backward is analogous to the impression commonly produced on a person seated in a stationary railway carriage when a train on an adjoining line moves forward. More strictly, it might be compared to the illusion produced by two trains, one on each side of the stationary carriage, moving forward at the same speed. When this is thoroughly understood there will be less danger in open-air swimming for those trained in tanks, ponds and rivers when they go out of their depth in larger bodies of water. They should also be taught to gauge their progress by watching any fixed object.

A Respiratory Method for Sleep-induction in Insomnia. G. J. Mautz²⁰ submits to clinicians for trial and report a method which he has used

²⁰ Journal of the American Medical Association, December 14, 1919.

with satisfactory results in some 20 cases during the past year. Ten years ago he first attempted to relieve the insomnia due to too much thinking, worry or trouble along the popular line of "mental gymnastics" by teaching patients to "dream" themselves into sleep. About 20 per cent. derived some benefit from that method, but it is more effectual when practised in conjunction with the present one, which he bases upon his recognition (in the somnolence artificially induced by anesthetics as well as in spontaneous slumbers), of an "initial stage of slow and shallow breathing" which coincides with the onset of semi-consciousness. His practical inference was to work the respiratory factor for all it is worth in the struggle for sleep. Having secured the best possible environment (quiet and warmth with good ventilation and a comfortable posture) the patient "should breathe slowly and shallowly, not too slowly at first, until the body becomes accustomed or adjusted to being quiet and in the recumbent position. After allowing about ten minutes for this, he should breathe less and less. Different subjects apply the same principle differently; they learn little tricks that suit their own case." Probably the best method is for him to take a fair respiration and hold after exhalation as long as he can with comfort, then slowly take another, exhale and hold again. He should be directed to continue in this manner. The subject may at first feel that he cannot control or diminish his respirations, but a little patience and effort will in a short time (within two weeks) prove that he can.

The present reporter's personal experience is in complete agreement with the soundness of that proposition. He believes that enough attention has not been given clinically to the well-known physiological contrast between the respiration of sleep and that of wakefulness. That contrast is best manifested in the almost instantaneous, quasi narcoleptic, dropping off of the physically tired man, to which our expression "falling asleep" must owe its origin, and also in his no less rapid awakening after getting his full measure of sleep. On lying down his respiration is immediately changed. He deflates his chest by two or three audible long and deep expirations, which are nasal in any normal subject. During the whole sleep his pulmonary ventilation is kept at a minimum by infrequent inspirations and expirations, so shallow as to be almost imperceptible. The first event in his abrupt awakening is a deep inspiration to inflate his chest again. Our method copied from this lesson of nature differs from Mautz's method merely in aiming at a greater effect by establishing at once the reduced respiration of sleep through rapidly emptying the lungs by a few deep expirations of the surcharge of air which belongs to the waking state.

Functional Paralysis of the Diaphragm with Acceleration of Respiration. Alexander Watson and J. S. Meighan²¹ call attention to the rapid and shallow breathing in late cases of gassing, attributed by Haldane to an exaggerated Hering-Breuer reflex. It has also been observed after shell shock. They believe that paralysis of the diaphragm from functional disturbance of the phrenic center may account for it in some cases.

²¹ British Medical Journal, March 15, 1919.

CASE I.—Pte. J. (nine months' service) was admitted for debility; he was a thin, undersized man, excitable and nervous, with a basal bruit, but no definite pulmonary signs. Respiration 33, pulse 80. On the seventh day tremors of the hands and legs developed, particularly in the right sartorius; knee-jerks slightly exaggerated and occasional slight ankle-clonus on the right; tactile and thermal sensation and eye reflexes normal. Next day the respirations were accelerated and fluctuating in rate (50 to 80). Ten days later breathing was still very variable and usually rapid; breath sounds harsher, but no rales at the base as before; transient albuminuria for three days. On the thirty-fourth day legs extremely tremulous, knee-jerks much exaggerated, but no ankle-clonus, and plantar reflexes sluggish. Careful charting showed increased respiratory rate (80 to 90) present only during the day and disappearing during sleep. On the hundredth and sixth day the patient was allowed to get up and walk about the ward quite freely. As the conditions stated remained unaltered he was transferred to a special hospital for neurasthenics, and, unfortunately, no further information has been obtained.

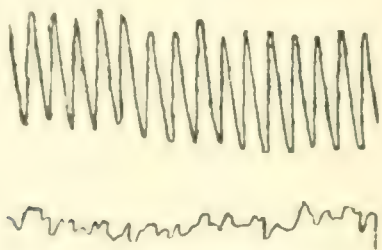


FIG. 7.—Thoracic and abdominal respirations in Case I. Rate 100.

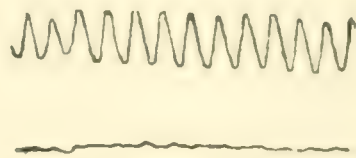


FIG. 8.—Thoracic and abdominal respirations in Case II. Rate 88.

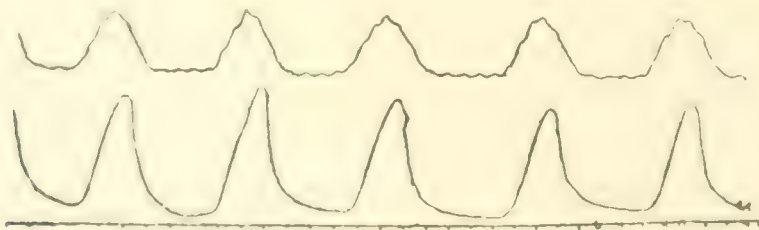


FIG. 9.—Thoracic and abdominal respirations from a normal man taken in the same way as Figs. 7 and 8. Rate 20.

CASE II.—Pte. Y. was sent home after five weeks in France, having been rejected for the army in 1915, owing to "neurasthenia," but accepted in 1917. He had had fits in infancy, intermittent otorrhea since childhood, acute rheumatism and acute pneumonia six years ago. He complained of difficulty in breathing, especially when lying down, discomfort in the cardiac region, and occasional attacks of pain in the arms and legs (first noticed after two weeks in France), and was described as a pale man of moderate physique, with enlarged cardiac dulness, apex beat in the fifth space at nipple line, no abnormal sounds, rhythm regular and slight tachycardia (96); respirations 50, labored and causing great difficulty in speech; no pulmonary symptoms or signs; no tremors; pupils moderately dilated; reflexes normal. On

admission to the hospital his smoking was drastically curtailed; but the tachycardia persisted as well as the rapid breathing observed both while awake and asleep. He was transferred to a special hospital for neurasthenic cases after his final discharge for "functional nerve disease." The respiratory movements are still rapid, but he is able to move about slowly.

At the request of Prof. Noël Paton, graphic records of the chest and abdominal movements were taken, by means of a small balloon on the chest and another on the abdomen, each connected with a recording tambour. The tracings show extensive and rapid movements of the chest, but only a mere tremor of the abdomen, which was proved to be propagated from the chest. As controls, tracings were taken in the same way from normal men. These demonstrate that it is possible for a normal person to breathe at the rate of 75 a minute or more without showing any sign of irregularity of respiratory movements or any decrease in the action of the diaphragm. The abnormal tracings, then, seem to indicate diaphragmatic failure as the cause of the quick breathing. In normal subjects no discomfort was caused by breathing at 75 per minute; but when the rate was increased to about 170 it could not be long maintained. So long as it was kept up it showed no decrease in the abdominal movements.

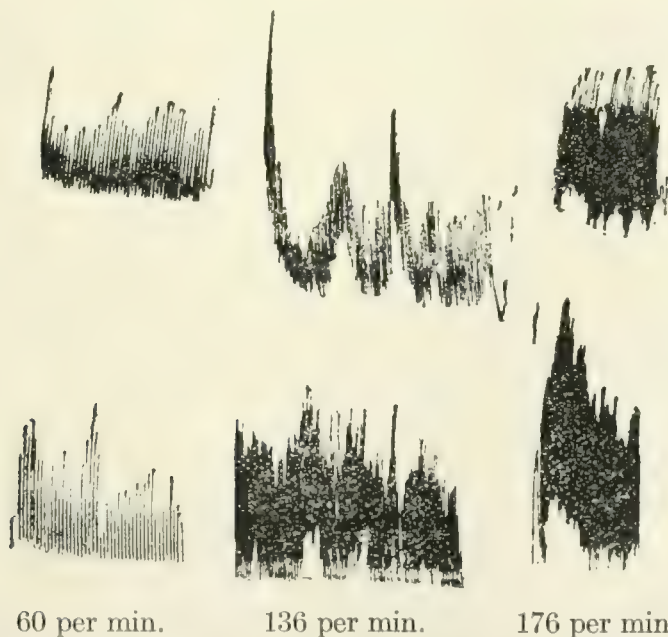


FIG. 10.—Thoracic and abdominal respirations from a normal man breathing 60, 136 and 176 times per minute, to show the absence of any decrease in the abdominal movements.

The Paralysis of the Diaphragm. In one of the cases diagnosed as such by G. Gerhardt the patient breathed shortly and insufficiently for the needs of the voice, and he could not breathe deeply. In some of his cases improvement or cure was said to have followed faradic or galvanic treatment of the phrenic nerves. Cowan, reporting on a case diagnosed as peripheral neuritis in a fat, flabby woman, possibly an alcoholic subject, says: "In the first week of December the diaphragm

was found to be paralyzed. The costal arch was unduly widened, the epigastrium fell back with each respiration and the hernia no longer descended into the sac. Cough was feeble and imperfect and largely replaced by choking fits. There was, however, no difficulty in breathing or cyanosis, and the respirations only numbered 26 per minute. The apex-heart had swung outward into the axilla, and the left chest was everywhere dull to percussion; and the respiratory murmur extremely feeble, and accompanied by a few fine rales." From this it would seem the paralysis of the diaphragm is not necessarily accompanied by any marked increase in the rate of breathing.

Paroxysmal Tachypnea. The two cases narrated above remind us of the singular paucity of references to tachypnea in the voluminous literature of the war neuroses. That riddle, for which we invited a solution in a previous report, is still unsolved. If this is, as commonly believed, a neurotic affection, why practically absent from the long list of neurotic manifestations, both genuine and simulated, reported from war shock and war nervousness? So striking in its features, how could its occurrence have been totally overlooked? Rare though it be in its peace-time incidence (and probably more infrequent in the male sex) it is hard to believe that no instances of it should have occurred among the millions of men submitted for four years to the varied ordeals of war while under constant medical supervision; and still more surprising is the strange fact, noted in our report for September, 1917, that a single medical observer in Italy recognized and accurately described from his hospital observations 5 striking instances of it in soldiers in whom he could not identify any hysterical tendency or any specially neurotic temperament. We would therefore renew our invitation to the thousands of army surgeons from the front or the base to search back for any stray cases in their recollection and in their clinical notes, and to publish their answer, yea or nay, to that simple question. A universal negative, though highly improbable, would in itself be a most valuable contribution to the morbidity of that mysterious affection. Our own impression is that the clinical phenomena must have been often enough witnessed, but never mentalized: most probably, as we then suggested, because in our medical text-books, nay in most of our special treatises on respiratory diseases, "tachypnea" is passed *sub silentio* and does not even appear in the index; and because, owing to its rarity, very few may have ever met with any instance of it in their own practice.

BRONCHIAL AFFECTIONS.

Fibroma of the Trachea is a rare thing. Although St. Clair Thomson states that it occurs second in frequency to papilloma, Sauer was only able to collect twenty-nine published records. J. B. Horgan's²² patient, a boy, aged nine years, was sent to him on August 10 with clinical signs of almost complete tracheal occlusion: Face livid; voice feeble but clear;

²² British Medical Journal, December 14, 1919.

pulse accelerated and feeble; orthopnea and marked stridor, especially during inspiration; the lower sternal and costal cartilages as well as the upper abdominal parietes and suprasternal notch in permanent and very decided retraction; no breath sounds in either lung, but a loud vibratory sound over the upper central sternal region. Tracheoscopy showed a normal pharynx and larynx.

The lowest possible tracheotomy was undertaken under infiltration with novocain-adrenalin solution (artificial respiration and pituitrin injection being resorted to during an interval of respiratory arrest). But the longest tracheotomy tube proved too short. The tracheotomy tube was removed and a small Luc nasal forceps introduced in the direction of the bifurcation, grasping and removing a hard pediculated tumor. Breathing at once became easy and consciousness returned. A lower tracheobronchoscopic examination was carried out five days later under ether-chloroform anesthesia, $\frac{1}{100}$ grain of atropine sulphate having previously been given hypodermically. The site of origin of the tumor was easily verified on the anterior tracheal wall immediately above the bifurcation and cauterized by a localized application of trichloroacetic acid. The patient made an uneventful recovery and returned home within a week of this examination. The tumor was found to be bilobular, the two portions being united at their base and lying together so as to form a globular mass, which was approximately the size of a small cherry. It was dusky red in color, of fairly hard consistence and the common pedicle was distinctly evident. Dr. Bronte reported that it was a fibroma and consisted chiefly of fibrous tissue and bloodvessels covered by compound epithelium. Horgan is inclined to the opinion that the tumor lay straddlewise across the bifurcation of the trachea, and that any air reaching the lungs did so across the upper and posterior surface of each lobe of the tumor. Apart from the site of the origin of the pedicle and the findings at operation, the size of the tumor when viewed *en masse* was such as to preclude the possibility of the patient living any time had the tumor occupied the trachea above the bifurcation. Brünings states that the tracheal diameter in children varies between 8 and 11 mm. The smallest diameter of the tumor referred to above was 1 cm. In this respect the case seems to be unique among the sparsely reported cases of tracheal fibromata.

Peanut Bronchitis. Six illustrative cases of this recent addition to our modern diseases are published by Ellen J. Patterson.²³ Since the advent of war economy has necessitated the use of "meat substitutes," the peanut's real value has been established. It needs only to have added to it suitable inorganic salts and the fat-soluble accessory to make it a complete food and a popular one. It is therefore high time we should consider the danger attaching to the peanut as a foreign body in the bronchi of small children and study the characteristic train of symptoms from the inhalation of fragments which continues until they have been removed bronchoscopically or evacuated sponta-

²³ New York Medical Journal, January 18, 1919.

neously, and the bronchus relieved bronchoscopically of its purulent accumulations. Her first case is thoroughly typical, that of a boy, aged eighteen months, admitted August 26, 1915, with the history of having choked on peanuts three days previously and coughed up fragments of the pericarp ever since. His color was good, but obstructive dyspnea was indicated by a marked indrawing of the neck and at the epigastrium. Physical examination showed that little or no air was entering the lower left lobe, and the roentgenogram confirmed the physical signs. Without anesthesia, fragments of peanut were removed from the lower left lobe bronchus through the 4 mm. bronchoscope. There was immediate relief from the dyspnea, and air was found to be entering all parts of the lung by a physical examination by Dr. Price. Twelve hours after the bronchoscopy it was necessary to perform tracheotomy, to relieve laryngeal dyspnea. The child developed a septic pneumonia and died on the fourth day.

Another boy, aged two years, was admitted to the Presbyterian Hospital June 2, 1917. Six weeks previously, while eating peanuts, he cried, choked and became cyanotic. From that day he was ill, restless, feverish, coughing and moaning in his sleep and dyspneic at times. He was discharged cured on the tenth day. On admission there were many moist rales both on inspiration and expiration, but air entered all parts of the lung. The radiogram showed a transparent foreign body at the opening of the left lower lobe bronchus. Without anesthesia the 4 mm. bronchoscope removed from the left bronchus a large amount of secretion and several fragments of peanut. The dyspnea and hoarseness steadily decreased. The temperature fluctuated between 99.6° and 101° until the seventh day, when it became, and thereafter remained, normal. This case shows that small fragments of peanut are at times held in the swollen mucosa and that they are not coughed up.

The third patient, a girl, aged eighteen months, while eating salted peanuts, choked and became dyspneic. The next day two bronchoscopies had been done at another hospital under general anesthesia, each lasting half an hour, but both had been unsuccessful. As the dyspnea was getting worse she was transferred to the Allegheny General Hospital. Without anesthesia a 4 mm. bronchoscope extracted a large piece of peanut kernel from the right bronchus. The dyspnea was relieved immediately, and on the fourth day the baby was discharged as cured. Too often, as in this case, the physical signs are considered indicative of the lesions present, but the origin is unsuspected.

In the fourth case, of one week's duration after eating peanuts, in a boy, aged twenty-one months, the roentgen-ray examination was negative. The bronchoscopy undertaken in spite of this showed only a large quantity of secretion and a severe tracheobronchitis; no nut fragments were found. Recovery was uneventful and the child was discharged well on the ninth day after bronchoscopy.

The fifth, aged two years, who was admitted on February 14, the eighteenth day after eating a piece of English walnut, was treated for bronchopneumonia, with increasing dyspnea, until March 3, and for signs of a complete atelectasis of the right lower lobe. Here again the

bronchoscope found a large amount of pus in the right bronchus and a marked tracheobronchitis, but no fragments of nut; a culture from the pus showed staphylococci. The lung cleared up slowly and the child was discharged on the fourteenth day. Both these cases illustrate the spontaneous evacuation of the foreign body, with after-symptoms persisting until the pus was removed bronchoscopically.

In the last case, aged eighteen months, the peanut seems to have been suspended in a large abscess cavity ruptured during bronchoscopy. This case demonstrates the necessity for tracheotomy to prevent the patient from drowning in his own secretions. The boy, who was admitted on April 27, had had his initial choking fit after peanuts on March 10. On April 27, at 11 A.M., the bronchoscope evacuated a very large amount of thick pus from the right bronchus and small fragments of peanut. The child was in excellent condition until 10.30 P.M., when suddenly a peculiar type of dyspnea developed, for which Patterson performed tracheotomy, with immediate relief of dyspnea and evacuation of thick pus from the trachea. At 7 A.M. the following morning the child suddenly coughed up about 2 ounces of thin yellow pus, and continued to cough it up throughout the day in large quantities. In the afternoon a large piece of peanut was coughed up into the trachea. He continued to cough up an unusual amount of pus for several days. The temperature also dropped and remained normal after the tenth day. The physical signs cleared up gradually and the child was decannulated on the twenty-eighth day. Much credit is due to Dr. Cowan for his prompt attention in saving the child's life and for his recognition of the symptoms indicating the presence of a peanut kernel in the bronchus. Undoubtedly, hundreds of children die owing to failure to recognize the true nature of the symptoms.

Hemorrhagic Bronchitis: Castellani's Bronchopulmonary Spirochetosis.

H. Violle contributes the following clinical notes from the Institute Pasteur. The symptomatology is as follows: The patient has generally been admitted "for tuberculosis," as he is spitting up blood. But this is often of a peculiar, vividly pink color, somewhat different from that of tubercular origin. The cough is frequent, sometimes more severe during the night. The physical examination of the chest in some cases reveals very little or nothing. In others there are signs of simple bronchitis with or without emphysema, and in some, signs of consolidation. The general condition is often fairly good, even very good, and very often there is no fever. The blood at times shows a slight degree of anemia, due to the repeated attacks of hemoptysis. The number of leukocytes is normal, and so is generally the leukocytic formula. The microscopic examination of the sputum reveals the presence of *S. bronchialis* in enormous numbers; the preparations are teeming with it. The best method for its identification is the silver nitrate one of Fontana-Tribondeau.

The *S. bronchialis castellani* is an organism extremely variable in length, shape and number of spirals, the length varying from 4 to 30, mostly from 7 to 14 microns. According to Fantham these medium forms are derived from the long ones by transverse division. In certain

individuals the spirochetes have very few spirals, perhaps two or three; others have large numbers with spirals very close; and there are numerous intermediate types. The morphology has been carefully investigated by Fantham, but the organism has not yet been cultivated. Violle has not been able to reproduce the disease in rabbits, guinea-pigs and pigeons. Chalmers and O'Farrell have, however, succeeded in infecting a monkey by intratracheal injection. Contagion from infected persons to healthy individuals takes place, according to Fantham, by means of the so-called "coccoid bodies" derived from the spirochetes. Without denying this, Violle believes that *S. bronchialis* may be present in very small numbers in any individuals, and that any cause, such as a chill, lowering the vitality of their tissues, may cause it to multiply and to invade the whole bronchopulmonary system. None of his patients had any mouth lesions of spirochetic origin, and their teeth and gums were in good condition.

The Diagnosis. Clinically, if a patient has bloody expectoration of a vivid pink color and is in good health the practitioner should be on the lookout for spirochetosis. Cases of mixed infection, with tuberculosis, occasionally occur; and some with bronchomoniliasis have been recorded.

The Prognosis, as a rule, is favorable; in many cases all the symptoms disappear within three or four weeks from onset. Relapses, however, seem to be frequent and chronic forms occur with fluctuating expectoration, at times greenish, mucopurulent, and at times mixed with blood.

The Treatment. In a large number of cases active therapeutic measures are not called for; rest, nourishing diet, and country air being sufficient to bring about a cure. Ergotin and tr. iodi (a few drops well diluted) should be given if the attacks of hemoptysis are severe. If there is not much secretion and the cough is very painful, opium preparations may be administered. As regards specific treatment, arsenic and tartar emetic have been used by Castellani and others, while certain authorities recommend arsenobenzol. Satisfactory results from such a line of treatment will at times be obtained in chronic cases. Violle, having shown that this affection is met with in France, urges that more attention should be bestowed upon its detection in all European countries.

Pulmonary Spirochetosis in Soldiers from Salonica Suspected of Malaria or of Tubercle. This preliminary note is contributed by J. A. Thomson²⁴ who was in charge of special malaria wards for men invalided home. Most of the patients were (a) debilitated, (b) suffering from chronic cough without definite physical signs, (c) not improving under antimalarial and tonic treatment and most often yielding a negative result on blood examination, (d) and frequently therefore suspected of tubercle, neurasthenia, or D. A. H. Having found spirochetes in considerable numbers in the sputum of one patient, he systematically examined the sputum of all patients complaining of coughs, by simple stains and by the special stain for tubercle, and was able to collect sufficient material to show that pulmonary (or bronchial) spirochetosis in a chronic form was apparently prevalent among them. That case

²⁴ British Medical Journal, September 28, 1918.

might reasonably have been suspected of tubercle: chronic cough dating from his period of service in Salonica; sallowness without much anemia or wasting; unfitness and dyspnea on slight exertion not explained by adequate chest signs or by identifiable malaria or pyorrhea. From October 3 to October 21, 1918, 79 cases were examined; 39 cases showed spirochetes and in 2 tubercle bacilli were present. The character of the sputa with spirochetes varied. The most common type was clear, jelly-like and non-aërated. A few were described as purulent, more as mucopurulent. In 3 cases (all without tubercle bacilli) the sputum was blood-stained. In addition to complaints of cough, many of the patients exhibited a combination of symptoms which is often seen in the wards of a special malaria hospital, namely, (a) poor general physique, weakness and listlessness; (b) tachycardia either after or without physical effort; (c) shortness of breath after slight exertions; (d) systolic cardiac bruits both at the apex and at the base, which, if not heard when the patient is at rest in bed, develops readily after slight effort; (e) low vasomotor tone, made very obvious by lividity and coldness of the hands when the patient has been standing and by the soft inelastic feeling of his body tissues; (f) nervous debility, tremors of the hands and tongue, low spirits and disinclination for mental or physical effort; (g) in many a temperature ranging slightly above and below normal. All the cases in which spirochetes were found were men invalided home from Salonica on account of malaria, after months spent in a hospital, with occasional short visits to depots where they apparently never did any useful work, and were regular attendants on sick parade. The total amount of quinine which had been taken by many could be reckoned in pounds rather than ounces. Thomson believes that many men with this train of symptoms do get attacks of fever when exposed to the physical and physiological strains of camp life, which are not of malarial origin. How often it may be due to organic degeneration of tissues produced during the acute stage of malaria abroad and never recovered from, is difficult to say. Other factors, too, go to confuse judgment, such as the general physical and mental stress and strain of war service, and the possibility of other infections, such as trench fever. All he wishes to point out is that chronic pulmonary (or bronchial) spirochetosis is present in many instances. This may be one of the causes of the debility; or the debility may merely afford favorable conditions of environment for spirochetes. Further therapeutical investigation would be necessary to estimate the true significance of their presence with the help of the drugs known to be antagonistic to them.

The spirochete has tapering extremities and a gently undulating outline without spirals; sometimes extended, often bent on itself, or entangled with others. It stains easily with fairly strong carbol-fuchsin (1 part carbol-fuchsin to 2 or 3 parts water) for a minute or two, or with a strong watery solution of gentian violet. Silver nitrate preceded by tannic acid as for *Treponema pallidum* is good, but the films must be very thin to get satisfactory results; and for that reason, when the spirochetes are scanty, a much longer search is required.

PULMONARY AFFECTIONS.

The Pulmonary Sequelæ of Gassing. In his report to the Académie de Médecine (February 4) on the after-history of 3525 cases, C. Achard gives prominence to the chronicity of the symptoms rather than to their incurability, and particularly to the long-lasting anemia and asthenia which might suggest the probability of an eventual tuberculosis. Happily, as confirmed by experiments on animals, the toxic action of the gases affords no encouragement, more probably an obstacle, to the growth of bacilli. It is therefore important not to mistake the signs for those of tuberculosis. The lungs cast no shadow; the sputum does not contain albumin, or only for transient periods; the fever and the physical signs gradually abate, and after several months or a year may disappear. He describes two instances in point. In one case the fever kept up for thirteen months but then permanently subsided. In another presenting signs of bronchitis and suspicious apical lesions together with hemoptysis, weakness, loss of flesh, and feverishness, as late as two years after gassing the evening temperature often rose to 38.5°C . But four months later the temperature was steadily apyretic, and the general condition began to improve. The gas in both cases was of the chlorine type. Only 6 of his patients evolved tubercular symptoms; in them the gassing may have merely aroused a latent tendency. The mustard gases were responsible for 84 per cent. of all the cases of sequelæ, but the lung injuries from gases of the asphyxiating type were the most serious and most apt to develop a tendency to emphysema or to a pseudo-tuberculosis. The degree and extent of the injury of the lung can be estimated approximately by the reduction in the amount of carbon dioxide exhaled per pound and per hour. As to the eyes, the sequelæ have not been as numerous or severe as had been feared; keratitis is rare, but cicatricial deformity of the eyelids, as well as of the hands and joints and genital organs, is more common, and may require operation. For the rest, septicemic infection, fortunately very rare, is a formidable secondary complication of the blistering burns from gas.

The Treatment of Irritant Gas Poisoning. A simple but most successful method has been practised for three months on board his ship by G. M. Lazenby,²⁵ by various modifications of the local use of a warm solution of sodium bicarbonate (10 grains to the ounce). His instructions to orderlies are as follows: (1) Before embarkation furnish a dressing table with a throat spray, eye bath, Carrel syringe, vaseline, plain gauze cut to size, cotton-wool, jaconet, bandages, and one pint of the warm solution. Cover with a clean towel. (2) After embarkation, select all the severe eye cases with eyelids closed through photophobia or dried secretion, and place over the eyes a compress of gauze wet with the solution, that they may be ready for treatment, the compresses having unsealed the eyelids and relieved the acute photophobia, after the milder cases have been dealt with first. (3) Bathe the margin of the lids until all the crusts can be wiped away with a wet cotton-wool mop. (4) Fill

²⁵ British Medical Journal, September 18, 1918.

the syringe with solution, and, taking a piece of cotton-wool in the left hand, draw down with it the lower lid. Instil a few drops into the eye from the syringe, and close the lids. Repeat this until all secretion has been washed away—about four times. Dry the skin with cotton-wool. (5) In mild cases leave the eyes uncovered except by the eye shade. In severe cases put on another compress, cover with jaconet and bandage on lightly. (6) In all cases it is better to smear a little vaseline on the skin to prevent irritation from the discharge.

For the throat or respiratory cases proceed as follows: (1) Fill the spray half full with the solution. (2) The patient sits up and gargles his throat and mouth with the solution. He then opens his mouth wide and breathes in and out. The spray nozzle is held an inch from the mouth and the jet directed to the back of the throat. The patient must sit up and respire during spraying. (3) Cease when the patient wants to spit out, and repeat four times. (4) All those who can see to use the apparatus should be instructed to carry out the treatment for themselves, using an eye bath for the eyes instead of the syringe. (5) Since success depends largely on frequency of treatment, patients must be dealt with every three hours. The last application should be made before lights go out at night; and in all severe eye cases the compress must be placed in position and secured with a bandage.

In a ward containing both gas cases and other respiratory affections the former are to be kept on one side; as when their percentage is large the orderlies always suffer from irritation of the throat and cough, and the other patients also cough more than they should for the same reason. As regards results: Photophobia is either completely relieved or markedly diminished, so much so that patients are soon able to open their eyes and discard their shades. The catarrh of the eyes still persists, but the pain is much relieved. In throat cases the immediate result is the expectoration of a large quantity of purulent mucus. The dry cough becomes loose and the pain in the chest lessened. The soreness of the throat usually persists. The chief benefit obtained is relief from the distressing night cough, and a good night's sleep. Chronic cases of two or three weeks are not materially relieved. The most successful cases are those from three to six days' duration. The treatment is suitable for all cases in transit from the clearing stations to England. Since they are for so short a time on board ship, it cannot be stated whether it is curative, but the relief obtained suggests that if these cases were treated continuously from the beginning, the period of convalescence would be materially shortened.

The Blood and the Bone Marrow in Certain Forms of Gas Poisoning. E. B. Krumbhaar's²⁶ hematologic examinations in mustard-gassed patients at a base hospital in France strongly suggest a deleterious action on the blood and bone marrow. The first change—apparently due to a stimulus to the bone marrow—is an increase in the erythrocyte and leukocyte count. The leukocyte rise (due to the polymorphonuclear elements) may be as high as 36,000 per cubic millimeter;

²⁶ Journal of the American Medical Association, January 4, 1919.

in his series it averaged 12,000. This increase soon disappears in the slightly gassed, and falls rapidly in the severely gassed patients. The shift of the Arneth scale to the right at this period indicates an exhaustion of the leukocyte-forming centers. If death does not supervene, an extreme degree of leukopenia (at the expense of the polymorphonuclears) may be reached. The leukocyte counts in four fatal cases fell steadily (1) from 10,200 to 2900; (2) from 17,800 to 3200; (3) from 20,400 to 7600; (4) from 36,000 to 14,000. In the femoral bone-marrow only a slight mottling was found, due to primordial cells and megaloblasts, with a greater or less disappearance of normoblasts, myelocytes and adult forms. This was interpreted as an inadequate attempt at blood regeneration, the lack of leukocytes in the blood stream constituting an important weakening of the body defences. In 2 reported cases leukocyte counts taken nine days after gassing showed the extraordinarily low counts of 570 (Harden) and 520 cells per cubic millimeter (Kerr), chiefly due to an almost total disappearance of polymorphonuclears.

The changes in the other elements of the blood are less striking; the initial rise in erythrocytes is replaced later by a moderate anemia (occasionally reaching below 4 millions). That this is due to lessened blood formation, rather than increased destruction, is shown by the normal condition of the plasma, absence of choluria, and of poikilocytes or blast cells in the blood stream.²⁷ In convalescent cases, the increased blood regeneration is shown by a distinct increase in the number of skeined cells, as well as the return of the leukocyte count to normal or slightly above. In the earlier stages at least the coagulation time of the blood is decreased; and platelets appear very numerous and large on a film, though no actual counts have been made. In the later leukopenic stage, the platelets are much sparser, and in one case a coagulation time of seven minutes has been noted. Attempts to apply this theory of damaged blood and bone-marrow to the treatment of gassed patients have so far not seemed practicable.

The Treatment of Acute Pulmonary Edema. Charles Greene Cumston's paper²⁸ contributed "from the surgical side" cannot fail to be appreciated by internists. *Primo sanguinare!* Molière's scathing sarcasm, aimed at the indiscriminate use of the lancet by the physicians of his day, is nevertheless a great advertisement of the paramount importance of its employment whenever, as in this condition, it is a first essential. The withdrawal of 300 to 400 gm. of blood from the general circulation decreases tension in the pulmonary artery and aids the right heart in its struggle against hypertension. Moreover, by removing part of a certain amount of the toxic products in circulation, it decreases the cardiac spasm due to their accumulation. Lastly, it protects those portions of the pulmonary parenchyma which are still in a normal condition against the serous inundation, by decreasing the congestion of the area involved.

* Pearce, R. M., Krumblhaar, E. B., and Frazier, C. H.: The Spleen and Anemia, Philadelphia, 1918.

²⁸ Therapeutic Gazette, 1918, p. 537.

In acute pulmonary edema venesection should be performed without any delay, in spite of the often extreme pallor which is due to asphyxia, not syncope. Most cases will be immediately relieved. But, in certain serious instances, further treatment is needed to fulfil particular indications. For the redoubtable bronchoplegia, hypodermics of strychnine are indicated; and electrization of the pneumogastrics has given good results. For the relief of any peri-aortitis, cauterization over the sternocostal area or wet-cupping is advisable. Rectal administration of carbonic acid was successfully resorted to in one case by Tessier, of Lyons, for the sake of its stimulating action on the respiratory center. Puncture of the right auricle with a long fine needle in the fourth right intercostal space has been practised with success by others to rapidly relieve the distention of the right heart. Aspiration by means of a catheter through a tracheotomy incision has also been resorted to to remove the liquid obstructing the respiratory field.

Acute pulmonary edema may occur in arteriosclerotic subjects to whom iodine in some form is being administered, even in small daily doses. Cumston gives an instance in point: A man of fifty-seven desirous of having his prostate removed, was told that if the arterial tension could be brought down and his body weight reduced, a suprapubic operation might be attempted. He was placed upon a proper diet; and took thiosinamin 5 gm. in a pill after breakfast, and one globule of iodine (Astier) after lunch and dinner for twenty days each month. He lost 46 pounds in six months, and the arterial tension was reduced to 18.5, so that Cumston decided to operate. However, two days before the date for operation the patient suddenly developed acute pulmonary edema. He just weathered the storm after the removal of 350 c.c. of blood. He lived for some two years afterward, but of course remained in possession of his prostate. As the urine never revealed the slightest evidence of any definite renal change, and the heart-sounds were normal, it would seem as if the iodine might have been responsible for the pulmonary upset.

As a prophylactic measure, after a patient has been the subject of an attack of acute pulmonary edema, a milk diet should be continued for some time; and, if necessary, from 1 to 3 gm. of theobromine may be given in twenty-four hours for the elimination of toxins, and to reduce arterial hypertension. Any causal affection must be attended to, such as nephritis, aortitis, rheumatism, etc.; but great care must be exercised in handling medicaments capable of provoking acute edema of the lungs. Acute pulmonary edema occurring during pregnancy offers two therapeutic indications, the cardiorespiratory and the uterine. Every pregnant woman who is a cardiopath and who presents the slightest trace of albumin should be instantly put on a strict milk diet. If edema should develop, blood should instantly be let, the quantity removed being proportional to the intensity of the dyspnea and not to the supposed resistance of the patient. If she then recovers, the uterus must be emptied; and if the pregnancy has reached the seventh month it is quite possible to have a living child.

The Food Question in Asthma and Similar Disorders. Fritz B. Talbot²⁹ has approached this question from the point of view of the Relation of Food Idiosyncrasies to the Diseases of Children. The study of anaphylactic cases shows that many individuals have a hereditary predisposition to sensitization. In a series of 28 cases of asthma, 62 per cent. gave a family history of anaphylaxis. Therefore, with a pronounced history of hay fever, asthma, or eczema in the direct ancestors, special care should be taken, when introducing a new foreign protein into the diet, to give it in a manner that will cause immunity and not sensitization. For example, if a nursing infant, thus predisposed, is given cow's milk at intervals of ten days or longer, instead of daily, it might become sensitized to cow's milk, just as animals are experimentally sensitized. During infancy and childhood practically all cases of sensitization are due to foods, since food is the commonest foreign protein. But during growth, a child adapts its body and habits to surrounding conditions. When puberty is reached he has either learned which particular foods he cannot take without feeling ill, or has taken small amounts of that food at frequent intervals and has gradually become "used to it," that is to say, become immunized. Past puberty then, the idiosyncrasies to food are relatively uncommon.

In infancy and childhood, asthma, recurrent bronchitis, eczema, and gastro-intestinal indigestion are the diseases which are most commonly due to food. Yet, although the cause in the cases reported has been proved to be anaphylaxis, this explanation cannot be given as the cause for all cases. The problem is most complicated. The commonest example of anaphylaxis, which has no doubt come within the experience of every one, is idiosyncrasy to eggs. This is characterized by violent vomiting, and sometimes diarrhea, whenever the patient takes eggs, especially when raw.

The Skin Test. It was formerly the custom to determine gross errors in diet by microscopic examination of the stools, to see if there was too much fat, starch, or meat passing through the digestive canal undigested. It is now possible, by means of the "skin test," to find out which particular food is at fault. A superficial linear incision is made, which breaks the skin of the forearm just enough to draw serum, but no blood. To this scarification is then applied the food protein to be tested. If the patient is sensitive a characteristic urticarial wheal, surrounded by a red areola, appears in from two to ten minutes; and it fades in one-half to two hours.

THE HEART AND THE BLOODVESSELS.

Syphilis and Cardiac Disease. That important subject is discussed up to date by Burton Peter Thom in *American Medicine*, July, 1918, after a brief retrospect into its history. Until recently the only cardiac lesion widely recognized was gumma. Even today, our increasing knowledge of this expression of syphilis is chiefly derived from autopsies.

Syphilis attacks the pericardium, the myocardium and the endocar-

²⁹ Boston Medical and Surgical Journal, August 29, 1918.

dium, in young and middle-aged individuals, with no previous history of rheumatism or exanthemata. It is often only by indirect evidence that the cardiac disease can be traced to its cause. The symptomatology of cardiac syphilis cannot be distinguished from that of other cardiac dystrophies. The diagnosis depends upon two factors; the recognition of the lesion and the presence of syphilis. The patient is not infrequently unaware that he has syphilis. Satterthwaite found about 5 per cent. of his cardiacs to be syphilitics. Cardiac syphilis can be assumed with almost absolute certainty where we find arteriosclerosis, coronary sclerosis or sclerosis of the ascending aorta. Aortic aneurysm is in nearly every instance syphilitic, and when the beginning of the arch is affected, as occurs almost invariably, there are secondary changes in the coronary arteries which may produce the symptom-complex of angina. Their involvement, however, is a separate entity from the peri-arteritis and endarteritis of the smaller vessels of the heart muscle.

The close relation between tabes and other forms of spinal and cerebral syphilis is not sufficiently recognized. The cardiac symptoms, as a rule, come on after the appearance of the nervous symptoms. These, as a rule, predominate and the cardiac lesion is often found only by accident or when the chest is examined. Cases of sudden death in tabes are doubtless due to dilatation resulting from myocardial degeneration, coronary thrombosis or rupture of an aneurysm. Subjective symptoms play an important part, such as palpitation, oppression and vague pains, accompanied by anxiety, in short, all degrees of symptoms up to angina pectoris, which may be the first and, for a long time, the only complaint. Many patients manifest psychic symptoms, a depression bordering sometimes on melancholia, a sense of impending death and a fear of paralysis or dementia.

Warthin has demonstrated that the *Spirocheta pallida* causes both parenchymatous and interstitial inflammation. The pericardium and the endocardium may be involved alone or simultaneously with the myocardium. The parenchymatous inflammation ends in fatty degeneration, simple atrophy, necrosis or pale degeneration. The interstitial inflammatory changes lead to edema, vascular and perivascular infiltration, myocarditis or gummata. Parenchymatous inflammation indicates a virulent type of the disease, the interstitial a mild and prolonged process, including vascular and perivascular changes.

Strangely, the *Spirocheta pallida* may be found in abundance in the cardiac tissues and yet be absent in other parts of the body, dwelling there, as it were, in a latent state. As myocardial degeneration occurs, not infrequently without any assignable cause, it would seem plausible from the foregoing facts that syphilis is more often the cause than is usually supposed. At autopsies on children dying from congenital syphilis, evidences of cardiac syphilis are frequently found.

Chronic interstitial myocarditis begins with a perivascular infiltration, undergoing later cicatricial changes, which may even go on to caseation or calcification. Eventually the muscle fibers atrophy and are replaced by fibrous tissue, and this neoplastic tissue may become hyaline or myxomatous. This fibrosis is not universal: some areas

escape, notably the auricles and the papillary muscles, while the left ventricle suffers more than the right. Another common type is obliterating endarteritis of the coronary arteries. If only a terminal twig is blocked, an anemic infarct may result, which is followed by local necrosis. But when the obliteration is progressive in a number of vessels simultaneously, extensive degeneration of the cardiac musculature takes place. The cardiac wall becomes so weakened thereby that a cardiac aneurysm results, with the consequent danger of thrombosis into the left ventricle, which, in fact, most inevitably occurs. Gummatous myocarditis is sometimes met with, but it is quite possible for a gumma of the heart to exist entirely without symptoms. Of the two, endarteritis is more frequently met with in acquired syphilis and peri-arteritis in the congenital form of the disease. It must not be overlooked, however, that the most severe myocardial disease may show no changes in the arteries whatsoever. Chronic interstitial myocarditis usually progresses insidiously, and is frequently not recognized until the heart is in exceedingly bad shape. When death occurs it is often with startling suddenness. The same is true of cardiac gumma.

THE TREATMENT OF CARDIAC SYPHILIS requires more individualizing than that of other forms. Often it offers a better chance of cure than cardiopathies arising from rheumatism or the exanthemata. But always with this proviso; if the heart is permanently injured, beneficial results will not occur beyond the amount of injury; the scars will always remain. Rest is absolutely essential, and those do best who remain in the recumbent position. Should the cardiac involvement be discovered while syphilis is still active, heart stimulants, such as digitalis, strophanthus, caffeine, adonis vernalis, etc., as a rule, give only moderate results. In the later stages, after fibrosis has occurred to a marked degree, cure is, of course, impossible, but digitalis and similar drugs may be given with more advantage, and to a limited extent they may prolong life and make the patient more or less comfortable. They often act best if combined with potassium iodide. The last-named drug is of no value if the fibrosis is extensive. It acts most powerfully when gumma are present and when the deposits or exudates are recent. If given as a matter of routine, it should be after the patient has received the benefit of previous mercurial and salvarsan treatment. Salvarsan occupies a most important place in the treatment, but it should always be preceded by a course of mercury. Brooks and Carrol have observed symptoms of circulatory collapse in badly damaged hearts. That is a contingency which must be reckoned with. It is not, according to Thom, as dangerous as many suppose it to be. Salvarsan should not be given under any circumstances (not at least until a decided improvement had taken place under the influence of mercury) in severe, uncompensated lesions, accompanied with dyspnea and pulse irregularity, emphysema and chronic bronchitis, and aortic or cardiac aneurysm. In giving mercury, the intravenous route, after the manner of Nixon, *i. e.*, a definite amount of some mercurial salt, such as the bichloride or the benzoate in watery solution—so that 0.6 c.c. equals 0.006 gm. of the drug as the initiatory dose—suspended in 10 c.c. of warm normal salt solution and the blood allowed

to flow into the syringe before injecting, is the method preferred by Thom to all others when possible, these injections being given every third day. Next to injections he prefers inunctions and then insoluble solutions, such as salicylate, gray oil or Lambkin's cream injected intramuscularly. No dependence can be placed on treatment by mouth.

All cases of cardiac syphilis should receive persistent treatment for at least a year after the symptoms are arrested. But it is well known that in some instances it is practically impossible to change a positive Wassermann to a negative. In such cases the nidus of the spirochete may be persistent in the spleen or in the liver or in the cord, or may be in the myocardium itself. It should be noted that a not inconsiderable number of cardiosyphilitics die suddenly after apparent recovery.

Tobacco and Neurasthenia. The following anonymous contribution to the *British Medical Journal* (December, 1918) comes as a timely warning: "Since the commencement of the war, tobacco has obtained far too great a hold upon the community generally, but I doubt whether the medical profession has fully appreciated the craving which neurasthenics have for tobacco, and especially in the form of cigarettes. A most prejudicial vicious circle becomes established, and, as one patient so truly confided to me, the inhalation of cigarettes is one of the causes of this disability. Neurotic patients who are candid with themselves and their medical advisers recognize this fact; but their loss of self-control prevents their breaking the habit. It is for the medical profession to assist them. But much more good might be achieved in the line of prevention by some authoritative pronouncement which would save a large number of susceptible subjects from drifting unawares into nervous degeneracy.

Cardiac Hypertrophy in Pernicious Anemia; Note on Nineteen Necropsies. Richard C. Cabot and Oscar Richardson³⁰ call attention to a new fact in the pathology of this affection. Of the 19 cases which they tabulate, only 1 presented no hypertrophy (heart weight, 202 grams); 2, slight hypertrophy without dilatation (300 and 310 grams); 2 others, with dilatation (267 and 360 grams); 1, of uncertain diagnosis, only dilatation (300 grams); 5, decided hypertrophy without dilatation (heart weight varying from 285 to 436 grams); and 8, considerable hypertrophy with dilatation (heart weight varying from 349 to 710 grams). In most instances no mention is made of any concomitant cardiac, vascular or renal damage. A striking illustrative case is given in greater detail, that of a teamster, American, aged thirty-two years, admitted June 14, 1913, with a two years' history and blood typical of pernicious anemia. In the five years between this date and his death, September 11, 1918, he was seven times in the hospital. Splenectomy was performed in January, 1914; a remission occurred over a year afterward and five transfusions were performed. He was able to work a considerable part of the time. Scores of blood examinations were made, one of which, made in June, 1916, is typical; red cells, 792,000; white cells, 4000; hemoglobin, 20 per cent. At necropsy there were the usual lesions of

³⁰ Journal of the American Medical Association, April 5, 1919.

pernicious anemia. The marrow showed megaloblastic hyperplasia. The myocardium was fatty and there was slight edema of the lungs. The heart weighed 710 grams. The arteries and kidneys were normal and there was nothing in the heart itself or elsewhere to account for the hypertrophy. Eighteen out of the 19 cases that came to necropsy in this ten-year period showed, in the judgment of Richardson, a definite hypertrophy or dilatation of the heart. In 3 of these, possible causes for the hypertrophy were found in the arteries, in the kidneys, or in valvular lesions of the heart itself. In the other 15 cases (or 83 per cent.) none of the usual causes (or accompaniments) of cardiac hypertrophy were present. The conclusion drawn by the authors is that cardiac hypertrophy, sometimes very considerable, is often associated with pernicious anemia.

A Contribution to the Study of Acute Rheumatism. F. J. Poynton narrates a case which he considers to be of the highest importance in the identification of the diplococcus of rheumatism, of which so much has been related and so little hitherto seen. Here it was at last detected *in vivo* and suppressed under treatment. Briefly, a delicate girl of seventeen years, the bearer of a double mitral murmur and an enlarged heart, was admitted on July 2, 1918. She also presented some thyroid enlargement and all the symptoms of Graves's disease, which were attributed to a simultaneous origin during an attack of rheumatic fever two years before. While she was slightly improving under rest, sedatives and x-ray treatment, on August 19 a severe sore-throat, soon followed by rheumatic erythema and polyarthritides, ushered in an attack of rheumatic fever which dilated the heart and set up, on September 1, left pleuro-pericardial friction and evidently considerable pericardial effusion. On October 6, serofibrinous fluid (18 ounces) was aspirated, which showed after centrifugation an abundance of minute diplococci, largely within leukocytes. Rapid recovery followed. The pulse-rate fell from 150 to 112, and the heart-beat regained definition and strength. An alarming attack of influenza, then prevalent in the ward, made her very ill from October 14 to 22, but did not dilate the heart. Thenceforth she made uninterrupted progress, leaving the hospital for Christmas, with a well-compensated mitral lesion. But two months later the thyroid, which had diminished greatly in size during her acute illness, together with all the other signs of Graves's disease, had commenced to enlarge again, coincident with an exacerbation of the exophthalmos, for which she came again under treatment, and it was apparent that there was a relapse of the hyperthyroidism. This case presents a clear issue. A patient the victim of acute rheumatism, with a heart injured by a previous attack, passes through a second most severe one while under observation, and the pericarditis is associated with the appearance of numerous minute diplococci. Death is threatened from influenza, but the patient does not die, the effusion does not return, the temperature falls and eventually the recovery is so good that she leaves the hospital able to walk short distances and with a compensated mitral lesion.

Some years ago Poynton, with Paine, had recorded the isolation of a

diplococcus from the blood and synovial fluid during life, and repeatedly emphasized the rapid destruction of the diplococcus in animal tissues by leukocyte and tissue cells. Now we have the further proof of its presence in the fluid from the living pericardium, and we have gained a further step in its life-history in man and further light upon the process of recovery in rheumatic pericarditis. Clearly, the cells in the exudate are busy destroying the diplococci. We are not surprised that cultures may not prove invariably successful, for if the process of their destruction is already in progress the sudden transfer to an artificial culture may give the final death blow to the harassed micrococci. This completely supports the results of experimentation and also serves to strengthen the extreme probability that in the human cases of rheumatic pericarditis in which there is little effusion, but great thickening of pericardial tissues, the diplococci shut in within the neurotic areas are imperfectly destroyed and flare up into virulence from time to time, and thus cause the intractable relapsing examples met with in childhood. Lastly, we can realize how difficult it must be to determine, when once a patient has been infected, whether a renewal of symptoms is evidence of a fresh attack or the recrudescence of latent disease, and we are confirmed in the faith that rheumatism must, above all, be "prevented."

Displacement of the Heart to the Left in a Case of Left Basic Pneumonia. This exceedingly rare condition, least likely to be overlooked in an affection where the heart is a special object of anxiety, occurred under Reginald G. Hann's³¹ careful observation, confirmed by *x*-ray examinations. The complete restitution to the normal excludes any explanation based upon the assumption of some preëxisting chronic abnormality in the chest. A private in an infantry battalion, in good health and hard condition, was wounded in the right lumbar region by shrapnel, on March 22, 1918. He walked about five miles and was exposed in the open throughout a bitterly cold night. Pneumonia seems to have commenced about March 26; he remained very ill until shortly before crossing to England, on April 10. His condition on April 11 was as follows: A big granulating wound in the right lumbar region, about 6 inches by 1½ inches, not penetrating the abdomen or thorax. Temperature and pulse normal. The left lower lobe solid and dull, with tubular breathing and redux crepitation. The remainder of the lung and the whole of the right lung were normal. The apex beat was 5 inches from the middle line, normal on inspection; no suggestion of hypertrophy, as the right border of the heart did not reach to the left edge of the sternum, over which the percussion note was resonant. Sounds normal; no bruit. At a later date the expansion of the right chest was evidently greater than on the left. On April 24 (about the twenty-ninth day of the pneumonia) some increase in vocal resonance and vocal fremitus, with impairment of the percussion note, was still heard. The position of the heart was as before. An *x*-ray examination on May 7 showed displacement, with the apex 4½ inches from the middle line; no dilatation. Left lower lobe nearly clear; the remainder of the thorax normal. On May 18 the apex was

³¹ British Medical Journal, August 24, 1918.

4 inches out and on May 22 had reached its normal site; lung normal. Hann's comment is as follows: "Norris has drawn attention to the possibility of mistaking displacement for dilatation in acute pneumonia. Herringham published two fatal cases, with displacement, in both away from the side of the lesion, and this he explained by the 'push' of the solid and therefore enlarged lobe. In this case the explanation presents greater difficulties. The displacement may conceivably have been due to the 'pull' brought about by some collapse of a portion of the left lung, or, more probably, by some changes in the right chest, of which the emphysema there noted was a manifestation." That view seems to be the most compatible with the previous record of perfect health and strength, and with their eventual restoration.

It may not, however, be necessary to assume the occurrence of any morbid process within the right chest. The functional respiratory disturbances occasioned by the paralyzing effects of the right lumbar wound and by the left basic pneumonia appears to us to be an adequate explanation for the overexpansion of the right thorax and lung as a mechanical cause for the cardiac displacement. A five mile walk is a severe respiratory strain upon a badly wounded man already jaded by fighting. His abdominal expiratory breathing being thrown out of action by pain; and his diaphragmatic inspiration completely abolished, at any rate on the right side, by injury to the lumbar muscles controlling the movements of the lower ribs, the inspiratory stress must have been from the first exclusively upper-costal, with a predominant loss of expiratory efficiency on the right side and with an inevitable tendency to passive overdilatation of the right upper thorax. Throughout his prolonged recumbency that initial unilateral disadvantage must have been perpetuated by pain and by the mechanical appliances for treatment. But, in addition, it was greatly increased almost from the first by the onset of pneumonic disablement of the left lung, throwing upon the crippled right lung nearly the whole of the work of breathing, and therefore an increasing overdilatation which could only cease to progress when the process of repair began to restore to it some degree of expiratory efficiency. In the final report it is stated that no vestige of emphysema could be found.

Ventricular Fibrillation with Cardiac Recovery. While it is generally believed that ventricular fibrillation in man is immediately followed by death, Gunn has shown that in small animals, such as the rat, recovery is not uncommon. The occurrence of ventricular fibrillation appears to have been demonstrated in man in 9 cases only, 7 of which were recorded by Robinson. In another remarkable case described by G. C. Robinson and J. F. Bredeck³² fibrillation of the ventricles was identified by the electrocardiograph during an attack of cardiac syncope thirty hours before the death of a woman with mitral stenosis and aortic disease, and subsequent electrocardiograms taken after the attack showed the presence in the ventricles of functional abnormalities of various forms. These abnormal complexes point to cardiac impulses arising in various

³² *Archives of Internal Medicine*, 1918, xx, 725-738.

points in the ventricles and travelling along abnormal paths in the ventricular muscle, many with abnormal slowness. Abnormalities were specially noticeable after the intravenous injection of strophanthin (1 mg.), resembling the deranged cardiac mechanism observed experimentally by Levy and Lewis in so-called "potential fibrillation." Robinson and Bredeck had seen these electrocardiographic changes in a patient who died suddenly after strophanthin, but at that time did not recognize their significance. Other sudden deaths occurring after strophanthin may possibly have been due to ventricular fibrillation. The disturbance of ventricular conduction detected by the electrocardiograph contraindicates the use of drugs such as chloroform, epinephrin, and strophanthin, which dispose the heart to ventricular fibrillation.

Two Overlooked Varieties of "Irritable Heart" are added by I. Harris³³ to the etiological list. (1) Latent and progressive pericardial and pleuro-pericardial adhesions sometimes arise by extension from a tuberculous, rheumatic or influenzal pleurisy, and are apt to interfere mechanically with the freedom of cardiac action. But, in addition, the infection may spread to the myocardium or even also to the endocardium, as a possible cause of valvulitis. (2) Colon bacillus infection is another unsuspected causal factor. He briefly describes 3 instances of it (in 2 girls aged twelve and thirteen, and a youth of eighteen, in which the cardiac irritability seemed to be attributed to a toxemic infection of the myocardium, as cultures of *B. coli* were obtained from the urine.

"D. A. H." and "V. D. H.": Their Practical Assessment for Discharge and for Pensions. A systematic questionnaire has been prepared by Thomas Lewis³⁴ in which this cardiac section is dealt with under the following numbers:

Question 11: Date of Origin of Disability? In all cases of simple D. A. H., which means practically "effort syndrome," the injury as to the date of the first symptoms should always have been made prior to any mention of discharge. In half the cases the reporting officer's answer will be: "in civil life."

In mitral stenosis if the first symptoms arose during the period of service, the answer is more difficult to give. An early stenosis may be taken as of at least three years' standing, a fully developed stenosis, as of at least five years' standing. With no history of antewar rheumatic fever or of chorea he will give the full benefit of the doubt to any early case. He is on his safest ground when rheumatic fever antedates his examination by three to five years, or in fully developed cases by some five to ten years.

In aortic disease, a positive complement-fixation test usually signifies not less than five years' standing. But, in contrast with mitral stenosis, "aortic defects often develop quickly from rheumatic disease." Similar considerations apply in the case of cardiac enlargement and of arterial disease and aneurysm. Serious disturbances of rhythm should always be dated from the first onset of symptoms.

³³ Lancet, May 10, 1919.

³⁴ British Medical Journal, December 14, 1918.

Question 13: What Are the Essential Facts in the History of Disability? Note always: (1) Capacity for exercise, games, work, etc., at school and at any other relevant dates; (2) dates of relevant infections; (3) date of enlistment; (4) length and tolerance of training and its type; (5) length and character of duty performed; (6) history of symptoms with any event which dates them.

Question 14: Were the Disabilities (a) Attributed to or (b) Aggravated by: Service during the war; previous active service; climate; ordinary military service before the war; or, serious negligence or misconduct? If not, to what attributable?

Question 15: The Present Condition, as regards symptoms, size of heart, thrills or murmurs, or any grave irregularity? A special note should be made of the observed tolerance of exercise. The questions 21-22 (a) are not stated here.

Question 23: Is the Disability Finally Stationary? If not, (a) How long is the present degree of disability "likely" to last? (b) If less than twelve months, can a further assessment at a reduced rate be made? In all "heart" cases the answer under (b) should be in the negative. All cases considered temporary or uncertain should come up for reëxamination.

Question 24 (a): What is the Degree of Disablement at Which the Man should be Assessed at Present, Independent of Hospital or Other Treatment? The degrees of disablement should be expressed in the following percentages: 100, 80, 70, 60, 50, 40, 30, 20, less than 20 or nil.

Effort Syndrome. There are two essential considerations: (1) The man's actual physical capacity for work without distress; (2) the advisability of his engaging in such work. The physical capacity of men discharged as permanently unfit from the army is reducible by an amount capable of computation from actual observations on their exercise tolerance while in hospital and from the amount and character of work they are able to do on returning to civilian life. In any complete group of "effort syndrome" cases it is found that 50 per cent. are discharged as unfit "for the army" within twelve months of their admission to hospital. The exercise tolerance of the men leaving hospital is very variable. In 20 per cent. it is gauged as normal or not so reduced as to depress materially their value in the labor market. In the next 30 per cent. it is reduced to the extent that there is appreciable difficulty in taking five-mile route marches and in doing stiff thirty-minute exercises. In the next 30 per cent. it is so reduced as to render the men incapable of such marches and exercises. In the last 20 per cent. it is reduced so that anything but very slight physical work is precluded, and that there is discomfort in walking even one or two miles daily. The capacity for work as judged by "return to occupations" acts as a check to the observed tolerance in hospital. In a group of 97 men discharged unfit as "D. A. H." cases only 8 were unoccupied less than nine months later, and this by reason of ill health. The average working hours of the group, according to the men's own statements, was forty hours per week, or almost six seven-hour days. Truly in that period there had

been improvement in the health of some of these men, as seen in the accompanying table; but, according to their own statements, it had only been slight, such improvement as occurred being largely attributable to return to home life and to the removal of the threat of duty overseas. Yet despite these relatively good hours, the capacity for work was clearly reduced. The seven-hour day is not to be compared to the eight-hour day of the heavy trades. The men had mostly light or sedentary occupations. The character of the work before is as shown in the accompanying table. As a fact, men originally in heavy employments pass in the main into lighter employments. Those originally employed on light or sedentary work show little loss of capacity after their term of army service. The number of hours at work is an unreliable index. A man from whom the army can obtain only an hour's work will work seven the moment he is subject to the wage-earning stimulus.

NUMBERS OF MEN ENGAGED IN WORK OF DIFFERENT GRADES.

Work before serving.		Work after serving.	
Heavy	27	Heavy	7
		Moderate	8
		Light or sedentary	10
		None	2
Moderate	27	Heavy	1
		Moderate	11
		Light or sedentary	13
		None	2
Light or sedentary	43	Moderate	1
		Light or sedentary	38
		None	4
Total	97	Total	97

The disability is to be judged in "effort syndrome" cases on physical capacity alone. The employments which the men take up do them no injury. On the contrary, they are beneficial, as evidenced by the improvement, slight though it be, in the group as a whole. The actual replies received from 104 (out of 109) men questioned within nine months after discharge were as follows:

SYMPTOM CHANGE AFTER DISCHARGE.

Very much improved	4
Much improved	8
Slightly improved	30
Unchanged.	56
Slightly worse	4
Decidedly worse	2

Very remarkable improvement was seen in some men coming to report themselves, but in the group, as a whole, it is no more than slight. The disability of those with fair tolerance may be placed at 20 per cent. or less, and in those with poor exercise tolerance at 30 to 40 per cent. Exceptionally it may be placed at 50 or 60 per cent. in rheumatic cases

or where development is poor. This group is the only group which should, but is not the only group which will come before invaliding and pension boards until demobilization begins. In the average the assessment of the disability at the first reëxamination of the pensioners should drop by some 10 to 20 per cent. if this reëxamination falls at the end of nine months, for during the first nine months their health will improve.

Mitral Stenosis. In early uncomplicated cases (stenosis such that the characteristic murmur is present on occasion only or only on lying down after exercise) the exercise tolerance is often quite normal. Many men who had spent months on front-line work or had been in heavy fighting were little the worse for it. Early cases show usually no reduction of physical capacity, but run risks when engaged in heavy work. With developed mitral stenosis, even if the exercise tolerance is good, the prospect of life is considerably reduced. The heart, as a whole, has been invaded and is rarely sound. A diastolic murmur or thrill constant in all postures, enlargement of the heart, venous engorgement and untreated fibrillation of the auricles should place the assessment very high. If two or more of these are found in combination, the disability is almost total. Fibrillation of the auricles is often the immediate precursor of heart failure, which may be warded off for a while by treatment and the disability temporarily reduced. As a general rule an enlargement of the heart combined with venous engorgement is in a worse way than one combined with an untreated fibrillation. For in the latter the muscle of the heart is sounder, bearing, as it does, a greater burden, while it shows the same embarrassment.

Aortic Valvular Disease. Here too similar considerations apply. But this is to be regarded as the more serious lesion, and to be assessed 10 per cent. higher throughout, not forgetting that the aorta and the coronary arteries are frequently involved. Some patients have perfect exercise tolerance. Many have fought in the front line without mishap, and some live to a good old age. In all these the lesion, as judged by the state of the pulse, is slight, and there is no material cardiac enlargement or other complicating factor. A poor exercise tolerance is, as a rule, a clear indication of seriousness. In assessing, the cases should be divided into "slight" or "developed."

Cardiac Enlargement. In many soldiers discharged from the army there is enlargement in the absence of valve lesion or other obvious cause. Where this is more than slight (slight hypertrophy such as is indicated by a maximal impulse four and a half inches from the nipple line or definitely beyond the nipple in the fifth or sixth space) or is associated with poor exercise tolerance the condition forms a serious disability. If untreated fibrillation is present and if a venous engorgement is added, then the disability is similar to that found in cases in which mitral stenosis is also present; the addition of mitral stenosis to such a picture does not materially increase the disability.

Arterial Disease. Thickening of the peripheral arteries when local does not impair the capacity for work; a given grade is of less significance as age advances. The chief symptoms of arterial disease and its chief disabilities are due to impaired nutrition of important organs

such as the heart, brain or kidneys. In an arteriosclerotic man, therefore, in addition to the exercise tolerance, the signs of enlarged heart, of high blood-pressure, or of renal involvement, are those which chiefly gauge the disablement.

Aortic Aneurysm or Grave Angina Pectoris naturally involves very high grades of disability.

Fibrillation of the Auricles has been known to last for thirty years, but the duration of life is rarely more than ten years. It is rarely uncomplicated. Standing by itself it suffices to assess the disability highly. It is recognized by gross pulse irregularity, not disappearing when the heart-rate is raised to 140 or over by any cause. The actual capacity for work may be greatly increased by appropriate treatment.

Auricular flutter is rare in soldiers. It can only be diagnosed with certainty by special forms of examination, but should be suspected when pulse-rates of 140 to 160 are steadily maintained under varying conditions of posture and exercise. Persistent flutter and fibrillation may both signify myocardial involvement. In assessing disability they may be treated alike.

Paroxysmal Tachycardia. When the attacks are mild and infrequent and the condition is uncomplicated (the usual picture) the disability is slight. More severe attacks debar the patients from heavy work even though the attacks are infrequent. Therefore, in gauging these disabilities the condition may be regarded as uncomplicated by obvious cardiac lesions. If so complicated, paroxysmal tachycardia may be assessed on the same lines as fibrillation.

Mitral Regurgitation. This condition has been deliberately omitted from the table of percentage disabilities. The diagnosis is uncertain; the cause not easy to ascertain. Nevertheless, in itself it does not lower exercise tolerance or in any way disable. The assessment of the disability, when regurgitation is thought to be present, should be based exclusively on associated factors, such as exercise tolerance, enlargement of the heart, rheumatic fever, recent or repeated fibrillation, aortic disease, etc. When exercise tolerance is normal and there is no history of rheumatic fever, no assessment is required. In cases of previous rheumatic fever with a good exercise tolerance it may be wise to assess at 20 per cent. or less. With no enlargement and fair tolerance the case falls in the "effort syndrome" group and starts with an assessed disability of 20 per cent.; with a rheumatic history it obtains an extra 10 per cent., thus rising to the level of early mitral stenosis, with good exercise tolerance. If slight enlargement complicates regurgitation the assessment is from 20 to 50 per cent., according to the exercise tolerance and the presence or absence of a rheumatic fever history. Consideration of the murmur itself is not only unnecessary in assessing, but would lead to endless difficulty for any fair assessment.

Question 24 (b): In Cases of Aggravation, or of any Evidence that there was a Disability on Entry, what in your Opinion was the Degree of Disablement Which Existed at the Time of Joining the Army? The answer should be expressed as a percentage. The chief considerations in "effort syndrome" cases which have arisen before enlistment are

precisely the same as in the "effort syndrome" group: (a) An estimate of exercise tolerance immediately before enlistment; (b) the effects of infection, shell shock, gassing, etc., after joining or any other serious happening on active service. In real heart disease arising before enlistment the occurrence of manifest aggravation when any material service has been given, and in general the lowest percentage disability given for the diagnostic group to which the man belongs in the percentage disability table, may be taken as the maximal (though not necessarily the minimal figures) for the disability at enlistment; because, although a lesion, such as early and uncomplicated mitral stenosis or aortic reflux, may have passed unnoticed by the recruiting board, being often still "prediagnosable" only, any coexisting complications could scarcely have remained undiscovered. The complications may therefore in general be viewed as "aggravations." Thus, in a case of mitral stenosis arising in civil life, the disability on enlistment should be placed no higher, though it may be placed lower, than 30 per cent. When there is uncertainty, the benefit of the doubt should be accorded to the man, and the original disability fixed at a low percentage. If, in arriving at the full disability, 10 per cent. has been added for poor development or for rheumatic fever acquired before serving, then it must also be added to the assessment of disability on joining.

The Common Factor in Disordered Action of the Heart. L. M. Murray, of the King's Canadian Red Cross Hospital, writing in the same number as Lewis, differs from the latter in his less exclusively "cardiac" consideration of the group variously known as "D. A. H." (British), "neurocirculatory asthenia" (United States), "effort syndrome" (Lewis) or "irritable soldiers' heart" (Da Costa). As plainly indicated in his diagram, the function of every system in the body may be additionally involved, although the symptoms referable to the circulatory and nervous systems are most in evidence, *viz.*, anxious expression, nervousness, tremor, increased reflexes and dizziness, giddiness or fainting, and changes in the blood-pressure and pulse. The symptoms common to all are breathlessness, palpitation, precordial pain and exhaustion. D. A. H. is always secondary; sometimes to some hereditary taint, but usually to infection, accident, injury, or to some single or repeated mental shock, which constitutes a turning-point in the life of the individual, henceforth unequal to physical efforts formerly accomplished without distress. The circulatory condition during "an acute attack of fever" does not widely differ from that in D. A. H. In both, those same symptoms are present, together with vasomotor disturbances from posture or exertion; sometimes, too, the same fast pulse, or in others, as in cerebrospinal fever, a relatively slow pulse. The pulse need not in all the cases be a rapid pulse while at rest or after exertion. Murray gives a case in point, that of a man of thirty-eight years, with a comparatively slow pulse which had existed without doubt from boyhood, as evidenced by: (a) Disordered action of known early date; (b) pathological changes (hypertrophy with some irregularity of the *a-c* intervals); and (c) a "dominant vagus nerve," as shown by the effect of drugs. Under tincture of digitalis (after Mxx four times

a day for four days) the pulse remained unaltered. Under tincture of belladonnæ (after Mx four times a day for four days) the rhythm became quite regular and was then not disturbed by increasing the respirations.

In the healthy, the nervous connections of the heart are not manifest, as they are nicely balanced, but only evident under special stimulation. That cardiac response to the vagus throws doubt on Sir James Mackenzie's suggestion that this points to a heart muscle which has escaped damage. In this case at least, where the vagus overcomes an abnormal heart muscle, we are driven to look for some factor behind the nerve, stimulating and intensifying its action to determine its ascendancy. The usual case has a rapid pulse because the exciting factor has an affinity for, and enhances the action of the cardiac sympathetic. The diagram illustrates the parts of this subject we know of. In common there is a predisposing factor which initiates bodily changes, giving rise, as end-results, to circulatory disturbances and to physical and psychological exhaustion. The common factor for both is the disturbance of the normal regulation of the intercellular activities, while the primary factor, as indicated in the diagram, may come from various directions and in different forms.

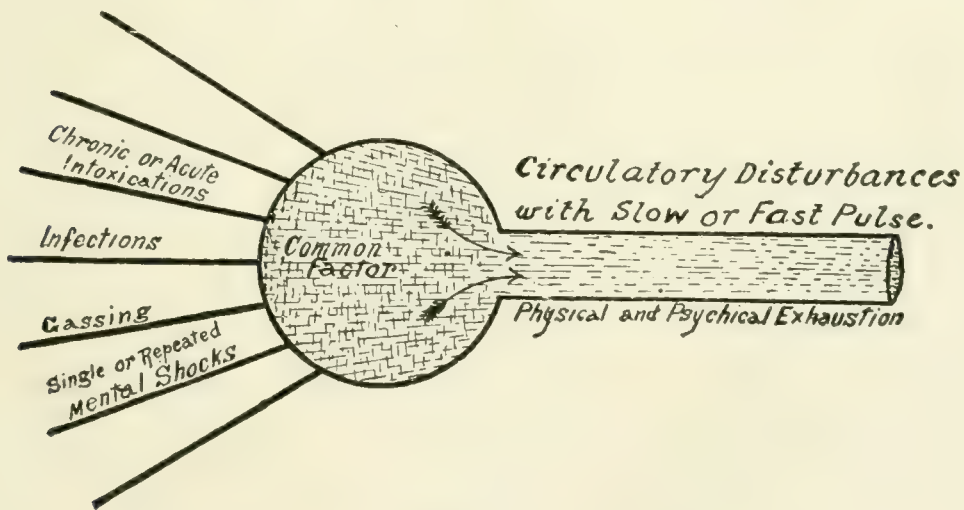


FIG. 11

For this "unsolved" problem the autonomic nervous system must form one part of the equation. "Anatomically" this system is divided into: (1) Cranial; (2) thoracic lumbar or sympathetic; (3) sacral. The sympathetic division is widely distributed throughout the body, while the cranial and sacral portions have only a restricted field. "Physiologically" the divisions possess dissimilar actions; as, when branches of the sympathetic division meet in any organ with branches from either the cranial or sacral portions, the effect displays their antagonism. Normally the opposed actions are balanced, but under various conditions one or other section may predominate, and in the heart in D. A. H. we may find either the vagus (representing the cranial portion) or the sympathetic (representing the sympathetic portion) in ascendancy. A second factor in the equation would be the circulating fluids, which in health supply the nutritional and chemical needs of the body and act as a nicely balanced medium for the correlation and mutual benefit

of the different cells and functions. These fluids are the chemical products of the cytoplasmic activity of all the cells; some of them are merely metabolites, but others specifically differentiated, both chemically and physiologically, yet dependent upon each other for their entrance into the circulation in a pure state and for accurate combined working. These bodily secretions are manifestly influenced by infections, by prolonged exertion, and by emotional excitement. During the siege of Paris, 1871, Graves's disease was common and Alexander reported a case following a bomb explosion. In our clinic almost every day we see cases with enlarged thyroid and symptoms suggesting its disturbed function.

The Adrenals. Ramond and François, in 1917, were able to collect, within the period of a few months, 26 cases of confirmed Addison's disease in their hospital sector. They concluded that there must be a slow, progressive, positive suprarenal insufficiency capable of arising from continual moral and physical tension. Two of their cases were associated with Graves's disease. W. B. Cannon has shown that Nature increases our reservoirs of power for the primary emotions by increasing the output of adrenalin, by mobilizing the energy-giving sugar of the liver in the circulation and by increasing the coagulation of the blood. The organism is thus rendered more effective, fatigue is abolished and provision is made for the conservation of blood in cases of accident, namely, by reflex responses to the emotions. This denotes the existence of a neurochemical relationship between the circulating fluids and the nervous system. By stimulation of the sympathetic he was able to deplete the adrenal glands of their active principle in a very short time. A similar stimulation occurs in the recruit while he is being taught the ardor and the skill of warfare, as well as during his presence in the field when a soldier.

In the infectious diseases and other debilitating conditions, the function of the adrenal gland is influenced in a similar manner. F. Lucksch regards the disturbance as a depletion of the gland itself. He gives the normal amount of adrenalin as 4 mg. per gram of dry adrenal weight. This figure falls in the infectious and other diseases, and may reach 0.35 mg., or in infants 0.13 mg. In Addison's disease, the figure is the lowest, and in nephritis the highest. That a depletion of the adrenals of itself considerably influences the general economy, and the functions of all the organs is shown by the work of Athanasiu and his pupil Grandinesco, who are quoted by Gley. They found that adrenalin, by its tonic influence on the endothelium of blood capillaries, regulates the exchanges between the blood and the tissue plasma, so that in its absence they lapse into profound disorder. Adrenalin is only one of many other equally vital chemical products in circulation.

Acidosis. Further qualitative changes evolve from the resulting alteration of the alkaline balance of the mixture. Bayliss, Moore, Barcroft, and others, are at present engaged in a controversy as to whether it is the alkaline salts or the amphoteric proteins which are interfered with; and as to whether the protection of normal blood acts as a "buffer" or as a "tampon," but the general opinion seems to

be that the hydrogen-ion concentration of the blood has been interfered with. There is as yet no absolute proof that the acidosis in D. A. H. is the result of a chemical change in the internal secretions; but only a fair inference that, in the reciprocal interglandular reactions of excitation and inhibition, when the balance has been lost, some one of the glands, in the attempt to replace the functions of another, may form compounds which are abnormal and acid in reaction in connection with the increased sugar present in the blood. A clinical study of the respiration in D. A. H. does not favor the theory of acidosis being exclusively due to deficient lung ventilation. The respiratory center and muscles are primarily interfered with by the altered circulating fluids, and the increased contribution of hydrogen to the circulation is secondary.

In D. A. H. it is not only the respiratory and autonomic systems which are disturbed. The changes in the function of the psychic, cardiac, locomotor and other systems are so pronounced as to suggest the cases being classified as psychic, neuromuscular, cardiac, etc. But the abnormal intercellular phenomena are accompanied by mechanisms apart from the nervous system and arising from the intermediary action of the circulating fluids acting either (a) "directly," by bathing the cell in an abnormal chemical compound affecting the chemical reaction of the cell itself or possibly the arrangements of the protoplasm and nucleus, or (b) "indirectly," through their action on the endothelium of the capillaries. The role of the autonomic system is that of "the small child who starts the motor car and is unable to pull the levers of control." By means of its more or less continued stimulation, a vicious circle begins: (1) Stimulated autonomic system; (2) altered body fluids; (3) altered function, in which all systems, including the autonomic system, take a part. Similar changes take place in the acute infections and other diseases and are followed by similar symptoms: Their importance in the history of D. A. H. being that once the vicious circle has been created, it is entered upon again more readily. The relation of single or repeated mental shocks depends on the degree of shock and the stability of the autonomic nervous system. Murray has never seen a satisfactory explanation of the symptoms of D. A. H., but has been led by these considerations to use the word "exhaustion" as synonymous with malnutrition of the cells, owing to the chemical perversion of their feeding juices.

Breathlessness, especially on exertion, is the most common symptom. If we were dealing with a normal respiratory center and muscles, and with a blood also normal, except for the addition of hydrogen-ions as a result of deficient lung ventilation, we might expect such a response of the centers and of the muscles that any disturbance of the potential alkalinity of the blood would be corrected. The respiratory system in D. A. H. cannot be judged by ordinary standards. The respiratory muscles have every evidence of exhaustion. We know that with increased hydrogen-ion concentration the rapidity with which the blood gives up its oxygen is accelerated, so that, considered clinically, it would appear that both the center and the blood required to be further activated by carbon dioxide in order to furnish the necessary response for ordinary effort.

Precordial Pain. Starling has shown that the reserve power of the heart is enormous and is dependent almost entirely upon its nutrition. The cardiac pain, whether accompanied by hyperesthesia or not, is merely the distress signal of an organ compelled to work in spite of a food supply, altered at least chemically. In Meakin's series of cases of hyperesthesia, two cases with a known toxic factor support this view: One an appendix case with an area of hyperesthesia on the right abdomen, as well as a precordial area, and one of chronic dysentery, with an area of hyperesthesia on the left abdomen, as well as a precordial area. In both, with the cure of the primary condition and the disappearance of the toxin, not only the local, but also the precordial hyperesthesia disappeared.

Palpitation is the outcome of an overacting heart or of extrasystole, and, besides the exhaustion, the vasomotor and other symptoms are explained by the changed character of the body fluids interfering with function. The final solution of problems involving disordered functional correlations of a chemical or neurochemical nature must remain in the hands of the physiological chemists.

The Adrenal Factor. In some of these views, primarily traceable to the pioneer work of Gaskell and of Langley, and ultimately to the writings of Crile and of Cannon in America, Murray had been forestalled by Langdon Brown (June, 1918) in the *first* of his Croonian Lectures "On the Role of the Sympathetic Nervous System in Disease" (only recently published in May and June, 1919) which deals in some detail with "the autonomic nervous system and its emotional response." While laying great stress on the many-sided adrenal functions and on the mobilization of adrenalin as an *excitor excitorum*, he notes the fact that the diametrically opposite view argued by Stewart and Rogoff has not yet been convincingly disproved and that the theory of the "emergency action" of adrenalin is still *sub judice*.

It is not foreign to that vexed question to quote from the "Remarks on the Pathogenesis of Deficiency Diseases and of Pellegra," by Prof. P. Rondoni,³⁵ of Florence (the outcome of years of experimental research), his tabulated *weighing of the adrenal glands* from guinea-pigs—in health, in starvation and after exclusive feeding on oats or on maize (the weight of the organ at death in proportion to the body weight = 100).

	Liver. Per cent.	Spleen. Per cent.	Suprarenal glands.			
			Male. Per cent.	Female. Per cent.	Pregnant female. Per cent.	Average Per cent.
Starving guinea-pigs	3.20	0.10				0.18
Oat-fed guinea-pigs	3.76	0.10	0.22	0.27	0.33	0.27
Maize-fed guinea-pigs	3.90	0.14	0.20	0.24		0.22
Normal guinea-pigs	3.82	0.12	0.10	0.12	0.14	0.12

Thus in all these conditions the adrenal glands are enlarged, principally in oat-eating and maize-eating guinea-pigs. The loss in body

³⁵ British Medical Journal, May 3, 1919.

weight is only one-third, while the relative weight of the adrenals is about doubled.

He believes that Maidism, at any rate, has features separate from simple starvation, and also from typical scurvy, although he was able to prolong the survivals by the administration of an alcoholic extract of cabbage-leaf containing fat-soluble A, made with acidulated alcohol of 37°.

Aortic Regurgitation. THE ETIOLOGY OF AORTIC REGURGITATION is the subject of S. Russell Wells's third report³⁶ of the "Collective Investigation of Ten Thousand Recruits with Doubtful Heart Conditions," conducted at the National Hospital for Diseases of the Heart by C. Chapman Gibbes, R. O. Moon, S. Russell Wells, P. Hamill, Frederick W. Price and J. Strickland Goodall. The extent and intricacy of that laborious analysis preclude any attempt to deal with its details and with the thirty tables illustrating its methods and its findings, for which the reader is referred to the original. It will suffice to quote the brief summary of the weighty conclusions arrived at on that important pathological question. "The results of this investigation lead to the conclusion that the two important causes of aortic regurgitation in the cases we have investigated—that is to say, men between the ages of eighteen and forty-one years—were rheumatic fever and strain. We have been unable to find any definite correlation in these cases between syphilis, tonsillitis, scarlet fever, diphtheria, pneumonia, gonorrhea or growing pains, and the evidence is against influenza. In regard to chorea, there is a suggestion in some of the results that it may be a cause, but the number of cases with which we had to deal was so small and the proportion of them giving also a history of rheumatic fever so large, that caution must be exercised in drawing deductions. In regard to a history of "rheumatism," there is some evidence for supposing that in a certain proportion of these cases, but not in all, an affection of the same nature as true rheumatic fever was referred to.

ENDURANCE IN AORTIC INSUFFICIENCY. Instructive facts and comments are recorded in the correspondence columns of the *British Medical Journal* for January and March, 1919, by Rudolf, Osler, Clifford Allbutt, Muspratt and Alexander Mouson. Osler's remarks are of peculiar interest. After puberty the endocarditic variety of aortic insufficiency is consistent with years of health, because the valve changes are not necessarily progressive, the aortic root is not involved and the coronary arteries—orifices and stems—are free. The degenerative form, usually syphilitic, is always serious, because the sclerosis is progressive, involving the root of the aorta and the coronary arteries (orifices and branches, one or other or both) are attacked. These vessels control the prognosis; if involved, even alone, at the sinuses of Valsalva, the heart muscle cannot be healthy. This is illustrated by the case of a medical man, aged seventy years, seen on June 12, 1912, who had cycled twenty-two miles to Oxford and returned the same way. He had had aortic insufficiency for twenty-five years, following arthritis and iritis (the diag-

³⁶ *British Medical Journal*, May 18, 1918; September 7, 1918; April 26, 1919; May 3, 1919.

nosis confirmed by Broadbent and others). The previous week he had cycled to Bath in one day, more than sixty miles. He was spare, red and muscular, with very sclerotic arteries, moderate hypertrophy of the heart and a loud diastolic murmur, collapsing pulse, etc. He said there was nothing the matter, but required for an annuity some idea of his expectation of life. He added that he had used more than 14 pounds of morphine and had taken at least 100,000 injections! The skin was everywhere scarred, pointing out the truth of a clinical axiom of Ellis, of Elkton, Md., the "*Hippocraticus rusticus*," as Weir Mitchell used to call it. Opium alone retards the progress of a chronic disease. I asked him to return for examination June 12, 1922, but he died suddenly two years ago.

Clifford Allbutt dwells upon the fact that death is liable to eventuate, as it were, "by accident"—from just too long a duration of bulbar anemia, due perhaps to a sudden effort, to a startle, or to some half understood inhibition, as after a full meal or a pipe of stronger tobacco. But another frequent mode is by extrasystole. To these patients extrasystoles are very perilous. Whenever a tendency to extrasystole is set up, sudden death is apt to occur. If this condition could be caught "on the hop," restoration of life might be possible. An academic friend used to come every six months for twenty-five years for a report as to the dimensions of his heart and his local and general condition. The state seemed static. The damage was originally due to an over effort in rowing. Ultimately he began to have extrasystoles occasionally. One day, while feeling quite well, he lay down after lunch on a sofa to read the paper, and died in an instant. He had been climbing hills in Cumberland a few weeks before. Another strong man came at various dates in Addenbrooke's Hospital for aortic insufficiency and failing heart. Each time he returned to his work as a coal porter. He died with the usual symptoms of heart failure; dilatation, dropsy, dyspnea, etc. He had suffered from rheumatic fever seventeen years before.

Alexander Morrison, in his interesting review of these instances and of that of Muspratt's hardy octogenarian patient, remarks that in all of aortic incompetents who show exceptional endurance under conditions of strain it is particularly desirable that some indication of the degree of valvular incompetence should be given. The aortic valve is the key to the amount of left intraventricular pressure. This is proved very strikingly in aortic aneurysm by the escape of the heart from hypertrophy when the aortic cusps are competent and by the hypertrophy of the left ventricle in proportion to their insufficiency. Such an estimation might be made clinically with approximate accuracy without much difficulty. The simplest method of gauging the degree of incompetence, apart from a consideration of the condition of the cardiac muscle, is the measurement of the diastolic blood-pressure (which may fall to 50 or 40 mm., or even lower) and the acoustic evidence as to the survival of the aortic second sound of the heart. Any difficulty in discriminating between the closure of the aortic and pulmonary arterial valves may be obviated by auscultating in the suprasternal

fossa, where the aortic valvular closure is alone audible. It can hardly be maintained merely on the strength of exceptional cases, and apart from the consideration of the muscular state of the heart, that aortic valvular incompetence is other than a grave condition or one in which the physician can advise other than a "quiet life," when possible; this need not, however, be that of an invalid.

We might add the following considerations which have a material bearing, not referred to by them, upon the clinical prognosis: (1) The circulatory evil and its endurances have their measure in the sectional area of the leakage. The larger area necessitates for its compensation a higher systolic pressure, which tends to maintain for a while relative cardiac efficiency for great muscular effort, as in coal lifting. At the same time it increases the intracardiac systolic strain and the progressive diastolic heart-dilating stretch, thereby shortening the delay before the terminal occurrence of heart failure in asystole. (2) The characteristically misleading feature of the murmur is that it is less audible, particularly through any non-rigid stethoscope, and liable to be more breath-like in direct proportion to the sectional area of the leakage.

Newgrowth Obstruction of the Inferior Vena Cava. Jacobson and Goodpasture's³⁷ case in a man, aged sixty-three years, is of special interest. A large hypernephroma of the upper pole of the left kidney extended through the renal vein into the inferior vena cava, which was distended in its whole extent, the right auricle being occupied and the tricuspid valve mechanically interfered with. The orifices of the hepatic vein were obstructed by clot, which, however, did not contain any growth, and there was acute necrosis with hemorrhagic infiltration of the centers of the lobules. After edema of the feet the abdominal veins became prominent, and twenty-four hours before death the liver suddenly enlarged and acid intoxication set in, pointing to acute thrombosis of the hepatic veins. The absence of hematuria and the late appearance of definite signs of obstruction of the inferior vena cava, although that vessel was occluded in its whole length at the necropsy, were remarkable features. Occlusion of the inferior vena cava by new growth is rare. Among Pheasant's collection of 314 cases of obstruction, there were but 43 due to this cause, and in only 1 was the inferior cava obstructed the whole way from the iliacs to the right auricle.

³⁷ Archives of Internal Medicine, 1918, xx, 85-95.

DERMATOLOGY AND SYPHILIS.

By WILLIAM S. GOTTHEIL, M.D.

DERMATOLOGY.

Adenoma Sebaceum. The apparent rarity of this affection is shown by the fact that it has not been mentioned in this review since the issue of 1901, when I first assumed charge of the department.¹ Shellmire² has recently recorded the only cases that have come under his observa-

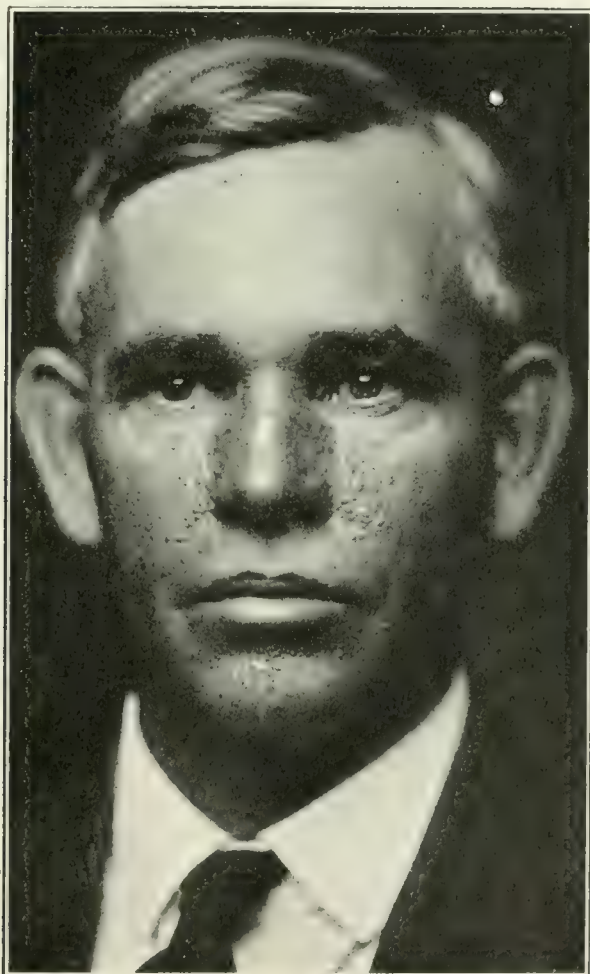


FIG. 12.—Adenoma sebaceum. Father of the affected family. Shellmire's case.

tion during twenty-two years' work in dermatology. He reports 5 cases in one family; this is very unusual, 3 in one family as reported by Spofford Taylor being the largest group heretofore reported. It is believed that the affection, which is essentially adenomata of the

¹ PROGRESSIVE MEDICINE, 1901, p. 135.

² Journal of the American Medical Association, September 21, 1918.

sebaceous glands, with peculiar degenerative changes of the secreting cells, appears oftenest in poor, ill-fed and feeble-minded individuals. Shellmire's family, however, was one of more than usual intelligence and general bodily development. As usual, in all 5 cases the face was studded with a varying number of pin-head to pea-sized reddish tumors, arranged symmetrically. The color, as is always the case, was distinctive. The microscopic examination showed that the tumors were composed of hypertrophic sebaceous gland material, with some cystic degeneration. The treatment employed was the use of solid carbon dioxide, electrolysis and the roentgen ray being held in reserve. The results from the first remedy were very good so far as the treatment had gone when the report was made.



FIG. 13.—Adenoma sebaceum. Gottheil's case.

I append to Shellmire's illustration a picture of an unrecorded case of my own (Fig. 13).

Cancer of the Mouth and Throat. Malignant disease of these regions often come under the care of the dermatologist, since it begins in many instances on the lips, tongue or nares. Clark³ has recently published an article on the subject, with special reference to treatment by electrothermic methods, either alone or in combination with surgery, the roentgen ray and radium, together with an analysis of 200 cases so

³ Journal of the American Medical Association, October 26, 1918.

treated. The author claims that electrothermic methods are peculiarly adapted to these cases; he says that malignant tissue, including bone, occurring in any part of the oral cavity may be destroyed with one electrothermic operation. It is not necessary to lay the parts open for treatment; with the mouth gag, retractors, forceps or endoscope access may be gotten to the affected part. The tissues become coagulated and are destroyed, the blood and lymph vessels are sealed, so that secondary hemorrhage rarely occurs, and the heat penetrates beyond the totally destroyed area and devitalizes malignant cells without impairing healthy tissue, thus lessening the likelihood of local recurrence or metastasis and conserving the maximal amount of normal tissue. The methods used are those of electrodesiccation and electrocoagulation, of which a brief description will be in place here.

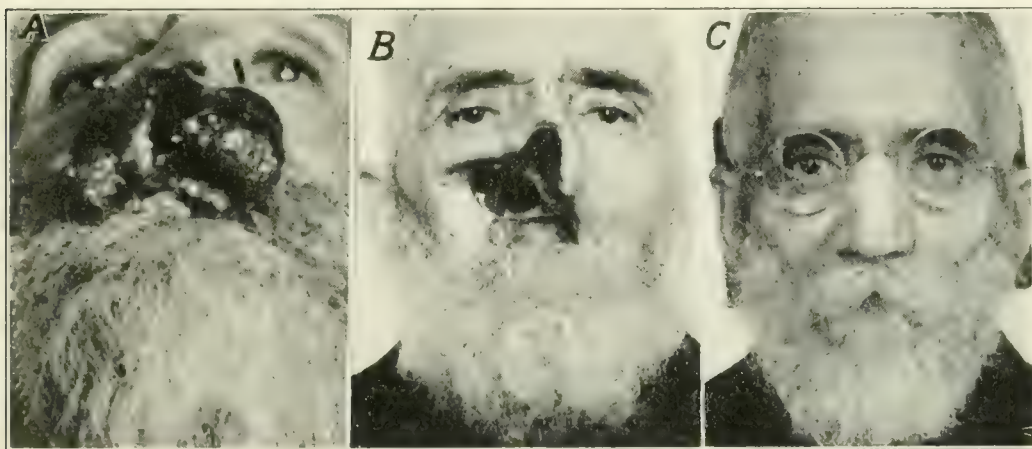


FIG. 14.—Clark's case of epithelioma of the mouth and adjacent tissues. A, original lesion; B, result two and a half years after electrocoagulation; C, cosmetic result.

Electrodesiccation is useful for lesions of smaller size, and is produced by a monopolar high-frequency current of the Oudin type applied to the lesion by a steel applicator; a steel knitting needle, bent or cut to shape, is most convenient. It is very controllable, so that a small growth on the canthus or even the cornea can be safely treated with it. The trauma and secondary inflammation are slight and the cosmetic results are excellent.

Electrocoagulation is produced by a bipolar high-frequency current of the d'Arsonval type; it is more penetrating and intense than the desiccation method, and is utilized to destroy larger growths even when they involve the bone. The technic is varied and a consideration of the electrothermic methods employed cannot be considered in detail here. The essential feature, however, is that the heat is not transmitted by contact, as is the case with the galvano or the ordinary cautery, but is generated within the tissue by the resistance offered to the current. Thus, we can destroy tissue at any depth, in parallel or divergent lines, dependent upon the size and arrangement of the electrodes and the strength and quality of the current.

The author employs surgical measures and the roentgen ray and radium in the endeavor to prevent recurrences; but he does not believe

in the efficacy of radiotherapy alone in any form of the affections under consideration. He rightly objects to the taking of sections for pathological examination some time before operation, since it favors metastasis or rapid extension of the disease by opening up the blood and lymph channel. It may, however, be done immediately before operation if required, and a diagnosis made from a frozen section in a few minutes.

A consideration of the author's results, as shown by his "before and after" pictures and his tabulated records, is interesting. So far as the desiccation treatment of the more superficial lesions is concerned the cosmetic results and the cures are about the same as those obtainable by other methods, such as excision, the cautery, solid carbon dioxide, the arsenical paste and other cauterants. With the deeper seated and more destructive lesions in which electrocoagulation with other methods were chiefly employed the results were excellent, though the percentage of relapses goes up to 50 in some classes of cases. I append three pictures of one of Clark's cases, showing an epithelioma involving the upper lip, antrum, septum, nose, alveolus and hard palate of three years' standing; then the final result two and a half years later; and, lastly, the patient's appearance after the application of an artificial nose, hard palate, etc.

Sporotrichosis and Tuberculosis. The difficulties that occasionally appear in the diagnosis of these two affections of the skin, which is of such radical importance for treatment, are well exemplified by the case reported by Eisenstaedt.⁴ The patient had been previously operated on for what were presumed to be tuberculous glands of the neck; and when, some two years before the writer first saw him, he began to develop growing nodules that broke down and formed chronic advancing ulcerating areas there was more than a suspicion that the cutaneous affection was tubercular in nature. On examination a number of similar lesions were found on various parts of the body, chiefly the limbs. There were superficial ulcerations varying in size from a quarter to half a dollar, and mostly covered with dark yellow and blackish crusts. The ulcers were sharply defined, irregular in outline and with slightly undermined livid red walls; the bases were covered with pale, elevated granulations, and occasionally yellow miliary abscesses were noted. In some places were thin, pigmented, movable scars, representing the sites of former lesions. In other places were nodules of more recent appearance, which has not yet advanced to the stage of breaking down. The lesions were irregularly scattered over the limbs and did not follow any definite lymphatic or nerve distribution; the lymph glands were not markedly involved.

Smears from the contents of a miliary abscess showed leukocytes, but no fungi or bacteria, mycelia or spores. Culture experiments, however, finally demonstrated a mycelial growth, with beautifully branching septate threads and pear-shaped attached spores, the characteristic sporotrichon parasite, as described by Schenck, Hektoen and

⁴ Journal of the American Medical Association, August 31, 1918.

others. On the other hand the microscopic examination of sections of the lesions revealed nothing characteristic; in fact, the diagnosis would incline to tuberculosis from them alone. The histology was that of an infective granuloma, with many plasma cells and giant and epithelioid cells. No necrotic areas were found, but there were minute abscesses.

From a clinical standpoint alone a diagnosis of ecthyma would have fitted the case, and a closer examination would have led to more than a suspicion that the affection was tubercular in nature. Eisenstaedt warns us that nodular and gummatous-like lesions of the skin that are indolent and painless, and that persist over a considerable period of time in spite of the ordinary treatment directed against the usual types of bacterial infection, should always lead one to consider sporotrichosis in the differential diagnosis. The affection appears particularly among farmers and people living in the country; it has been observed at all ages, but chiefly among men. A bacteriological diagnosis is usually necessary for certain differentiation, but the fungus grows readily upon potato and the test may be made even in the absence of regular laboratory facilities. I append a picture of some of the lesions in Eisenstaedt's case (Fig. 4).



FIG. 15.—Sporotrichosis. Eisenstaedt's case.

SYPHILIS.

Syphilis and the War. A wave of hysteria is apparently sweeping over the country as the demobilization of our army proceeds, and the apprehensions of the authorities at Washington and the Public Health Service have been communicated to the local health boards, so that measures of all kinds, good and bad, practical and useless, are advocated and attempted. Let me not be misunderstood, however. There are necessarily dangers attendant upon the return of 4,000,000 men to

civil life under conditions that are abnormal and characterized by the absence of many of the restraints that are operative under ordinary conditions. But there are other factors that operate in exactly the other direction. Presumably no man will be discharged who is in an actively infectious condition. They are, on the whole, in excellent physical condition, as ordinary observation of the returned soldiers shows. The interval of time between their discharge and their return to the communities from which they came is, on the whole, a very short one; and all the facts that I have been able to gather from observation and reading do not lead me to conclude that the social factors which would influence the spread of the syphilitic contagion are not very different in France and Germany, where most of our soldiers have been, than they are in this country.

Nevertheless, as editorial comment⁵ has recently pointed out, there can be no doubt that increases in the incidence of syphilis have in the past followed the demobilization of large armies under conditions in which this danger was not provided for. In an army composed of millions of young men it is inevitable that there must be a certain proportion who are in the active contagious stages of the luetic infection. And demobilization after a long period during which the ordinary restraints of home life have been absent, and the intervention of a period, even a brief one, between that occurrence and his return to normal surroundings, necessarily exposes the soldier, and through him the community to which he returns, to certain dangers. Yet the precautions to be employed, though possibly difficult of fulfilment, are in their main lines quite simple and effective. And they are being instituted at this writing. I do not, therefore, anticipate anything of the nature of a syphilis epidemic or pandemic, and that therefore the panic concerning this possibility that seems to prevail in certain quarters is not justified.

The first precaution, of course, is not to return a soldier to civil life, if it can legally be done, so long as he is in the first, active and contagious stages of the disease, with the exception, of course, of cases in which there is a reasonable certainty that the serious nature of the infection is appreciated and that proper treatment will be instituted. This necessarily means the retention of the soldier with the colors for a period of some weeks or months. This is a hardship, of course, for these patients are usually quite well physically during this time, and, as a rule, perform their ordinary avocations if in civil life. But it is an individual hardship that I think is entirely justified in view of the danger of turning an infective individual loose on the community.

It is, of course, quite impossible to keep these cases in the army until they are cured. I know of only one criterion of positive cure in syphilis, namely, reinfection; and even that is not absolute, since an attenuated virus may possibly permit its occurrence. A negative blood test does not necessarily mean cure; it may become positive again after a time. Again, we cannot say just how long after infection mucous patches or

⁵ Journal of the American Medical Association, December 7, 1918.

condylomata may occur. But in a general way, and we deal necessarily with generalizations in such a subject, the actively infective and dangerous stage of syphilis lasts from a few months to two years or so. During that time it is quite impossible to say when infective symptoms will appear or whether they will appear at all. Treatment will remove them when they occur, and treatment will also tend to prevent their occurrence. Treatment should therefore be vigorously prosecuted during that time. For a number of months, therefore, it is desirable to retain the infected soldier and treat him.

There will necessarily come a time, however, when the soldier must be discharged, even when signs of active syphilis have recently been present. Luckily, these signs, though they may be danger signals so far as the individual himself is concerned, do not usually mean that he is contagious to his surroundings. Given then a lapse of a period of some months, and given also the administration of the amount of treatment that experience has shown is usually required, the patient should be discharged from the army. We must not lose sight of the facts that men's lives are of value to themselves and their families; that in civil life nothing like such enforced treatment is practicable; that these men will be nothing like so dangerous to their surroundings as the cases that acquire syphilis out of the army; and that questions of expediency, though deprecated by the writer of the editorial above quoted, must necessarily be taken into consideration. We must not penalize a syphilitic who is in the army any more than is absolutely required by the interests of the community, and we must not attempt to set up a standard for the enlisted infected man that we would not for a moment, that is for a sane moment, attempt to apply to the civilian under similar circumstances. Few of us, I am sure, sympathize with the attitude of the extremists who would incarcerate an unfortunately infected individual in a hospital or elsewhere, until, forsooth, he is cured; that is to say, possibly for the rest of his life.

When the syphilitic is discharged it is, of course, entirely proper for the civilian health authorities to use every legitimate effort to see that he receives proper treatment if he requires it. How far the supervision should go and what means should be used to ensure its efficacy are matters, of course, for the local health boards to regulate. In some instances they have undoubtedly not done enough; in others they have equally positively gone too far. It is entirely proper, for instance, that every effort should be made to see to it that the discharged syphilitic goes under medical care, either public or private. But the treatment of syphilis is not so recondite a matter that special requirements of boards of health are necessary to ensure its being carried out.

Regarding the concrete application of these considerations, I may say that I agree essentially with the writer of the editorial above quoted. A soldier in the primary or early secondary stage of the infection should be kept in the service, if possible, for four or six months, during which time he should be subjected to a most vigorous course of treatment. At least two courses of arsenical and mercurial treatment should be administered in that time. He need not be in the hospital save during

the acute exacerbations of the disease; during most of the period he is quite able to perform his ordinary duties. During this time he will have passed the stage when the acutely contagious phenomena are most liable to occur. Contagious lesions may occur later, it is true; but since we cannot set any exact limit of time during which they are liable to occur, and since we know that their liability of occurrence gets less and less as time goes on, it seems to me that we must be guided by our experience with the average run of cases. After a period of several months of vigorous treatment, and in the absence of acutely contagious symptoms, the soldier should be discharged. Every precaution possible, of course, should be taken to ensure the discharged man remaining under observation and under efficient treatment. But I hold that it is not proper to keep such patients prisoners for prolonged periods of time. Some authorities would keep such men until all danger of acutely contagious symptoms appearing has gone; alas! who can tell, save in terms of years, when that time shall have arrived. And have we not in civil life tens of thousands of similar cases in whom it is impossible to do more than institute proper treatment and give appropriate advice. Some extremists have even demanded that the soldier should not be discharged from service until he is cured, a proposition that is ridiculous on its face. Who can tell when syphilis is cured? Of course, when reinfection occurs the attack is ended; but no one would suggest that as a test.

Above all things we must avoid what would be class legislation of the war obnoxious kind, penalizing an infected man because he is in the army. We attempt nothing like it with the infected individual when he is not in the army, though I think some health authorities would like to treat every syphilitic as a criminal and put him under control of the prison authorities. This is a symptom of the syphilophobia that is epidemic just now, though I doubt its being a real syphilophobia; it is rather to be regarded as a part of that mania for governmental supervision and control, that wave of so-called "uplift" that is sweeping over us in spite of the world-wide evidences of the condition into which similar tendencies in Germany have brought the world.

In the later stages of syphilis, when the disease is six months or a year or more old and contagious symptoms have appeared, I hold that a single course of treatment, and the subsidence of contagious symptoms, is all that should be waited for before the soldier is discharged. The patient may have contagious symptoms again, but the chances are that he will not have them. To keep him longer is an injustice both to the individual and the community.

When it comes to late syphilis or to syphilis that is evidenced only by the blood or by tertiary signs, the sooner the army gets rid of him the better. He is dangerous to no one but himself; he can infect no one; if he procreates his children will probably be healthy. He is not a danger to the community, and it is an abuse of authority to keep him under control either of the army or health authorities. His case is no different from that of any other infected person, and luckily our public health personnel, anxious as they are to increase their control

and enlarge their bureaus, have not yet attempted to take all syphilis under their wing.

The gist of the whole matter is simply this:

1. There is no danger of a syphilis epidemic from our returned soldiers; there is danger of an epidemic of syphilophobia among those who have stayed at home, with lamentable consequences.

2. While immediate treatment and possibly some retention in service is required in early contagious cases the former should be as vigorous and the latter as short as possible. The soldier should be allowed to resume his civil relationships as soon as possible and should not be penalized in comparison with a civilian who contracts the disease.

3. Common-sense and a due balance of the possibilities and necessities of each case are required. Syphilis is a dangerous disease in many cases, it is true, and its spread should be controlled when possible.

But our humanitarian endeavors should not lead us to the commission of rank injustice, and our zeal for the collective weal should not make us neglect individual rights entirely.



FIG. 16.—Multiple chancres of the penis. Sargent's case

Multiple Chancres of the Penis. It ought by this time to be a well-known fact that the statement in the older text-books to the effect that the chancre is a single lesion and the chancroid and herpes are single ones, and that these characteristics are of the utmost importance in differentiating between these affections, is an essentially erroneous one.

Both chancroid and herpes may be and often are evidenced by a solitary ulcerative lesion, and the number of instances of multiple chancrous lesion is so numerous that syphilographers lay but little stress upon this feature in making a differential diagnosis. In this review some years ago I⁶ recorded a case with not less than seven distinct initial lesions, three of which were penile and four seated upon the face. These lesions did not appear at one and the same time; the patients carefully kept a diary which showed that just thirty-nine days elapsed between



FIG. 17. —Multiple chancres of the penis; four separate lesions. Gottheil's case.

the beginning of the first penile and the appearance of the last extra-genital lesion upon the face; in other words, the patient accidentally and successfully reinoculated himself either from himself or from another syphilitic six times during the period in which his disease was still localized and he was still subject to infection. After that, though the chances of inoculation were, of course, greater, the more lesions there were present, no further infections occurred, for the general infection that occurred by that time, as shown by the usual symptoms, rendered all his tissues immune to further primary inoculations.

Osler,⁷ indeed, states that in about one-fourth of all cases the lesion is multiple, which in my opinion is too high an estimate; perhaps one in eight or ten would be nearer the fact. Yet the specifically recorded cases of multiple sclerosis seem to be few. Sargent⁸ has been able to find but one completely recorded case in the last ten years, that of

⁶ *PROGRESSIVE MEDICINE*, 1913, p. 133.

⁷ *Modern Medicine*, p. 454.

⁸ *Journal of the American Medical Association*, January 11, 1919.

Zeissler,⁹ in which there were two separate lesions of equal age on the lower lip of a colored woman. He recalls one case of his own also in which there was a double chancre of the cheek.

Sargent then records a recent case of his own in which there appeared two distinct and characteristic chancres, one on each side of the sulcus, one of which appeared four weeks after the other. The case is exactly parallel to the one which I have mentioned above; reinoculation took place within the limits of the time of secondary incubation, before the system had been immunized by the advent of a general infection.

I append a picture of Sargent's case, showing the two inoculations with a bridge of unaffected tissue between them, together with one of my own, showing four distinct scleroses of the sulcus, being four in all (Figs. 16 and 17).

⁹ Journal of the American Medical Association, May 26, 1917.

OBSTETRICS.

By EDWARD P. DAVIS, M.D.

PREGNANCY.

The Value of the Conserved Ovary as Regards Pregnancy. Polack,¹ contributed a paper, with illustrations, on the end-results of the conserved ovary. His study embraced 73 re-operations on patients in whom one or both ovaries had been conserved. From this material he concluded that routine conservation, without due consideration of the ovarian and contiguous pathology in each individual case, is not wise. The condition of the tunica of the individual ovary and the type and duration of the existing infection, determine largely the question of the possible regeneration of the ovary to be conserved. Even with the most careful technic, the ovarian circulation is impaired without the uterus, and the retained ovaries are always the focus for possible trouble.

The life-history of the retained ovary without the uterus is of short duration, while the trophic influence of the gland has been greatly overestimated.

Pernicious Anemia Complicating Pregnancy. Findley² states that pernicious anemia occurs with unusual frequency in parturient women. Prolonged lactation, frequent child-bearing, the toxemias of pregnancy and bad hygienic surroundings all contribute to this result. It cannot be shown that postpartum hemorrhage or puerperal infection tend to develop pernicious anemia. It is also rare in primipara and is most often seen during pregnancy which has been preceded by the birth of several children in rapid succession.

The disease usually manifests itself about the sixth or seventh month of gestation, when the patient becomes rapidly pale, with digestive disturbances, hemorrhages from the nose, stomach or bowel, disturbance of respiration and vision, vertigo and headache, rapidly failing strength, with palpitation of the heart, edema of the lower extremities, loss of reflexes, ataxia, rapid pulse-rate and a low temperature. The blood shows great diminution in the red cells, sometimes as low as 250,000 without proportionate decrease in the hemoglobin. The shape and size of the individual cells are greatly changed; rudimentary forms of the blood corpuscles are abundant, nucleated red cells do not appear until the disease is well advanced.

At autopsy the body is very anemic, with fatty degeneration of the heart, liver, kidneys, stomach, intestines and intima of the bloodvessels, while small hemorrhagic areas are found in the brain, spinal cord, kidneys, pancreas, pleura and pericardium. The spleen is sometimes enlarged,

¹ American Journal of Obstetrics, August, 1918.

² Ibid.

but the lymph glands are not, and the bone-marrow is of a lemon-yellow color. Fatty degeneration of the placenta and decidua has been found in many cases, and may be the cause of miscarriage.

Very early in the disease a positive diagnosis is impossible; this may be called the incipient stage and raises the question as to whether the actual disease can ever be cured. During the disease, periods of marked improvement occur, followed by relapses. The percentage of actual cures is so small as not to justify hope in any given typical case. Experience shows that if the disease develops early in pregnancy more than half of the mothers miscarry, followed by speedy death. When the disease is not manifest until the seventh or eighth month, in fully half of the cases miscarriage, with death of the fetus *in utero* or soon after delivery, will occur, but pregnancy is not interrupted in almost an equal number of cases. In about half the cases, however, labor is terminated at, or near, term, with the birth of a healthy child showing no evidence of the disease. The interruption of pregnancy in these cases is a misfortune, as patients always become markedly worse.

When the disease is pronounced, the maternal mortality is 100 per cent. In exceptional cases, the fatal result is postponed for a year or two after childbirth and some patients have lived after the disease, in one instance seven years and in another eleven. Periods of great improvement may occur without affecting the fatal result. The earlier in pregnancy the disease appears, the more rapid is the course and the worse the prognosis. In one case at seven months the mother was apparently well, but within fourteen days the hemoglobin was 30 per cent. and the red blood cells 1,000,000. Death usually occurs immediately after labor, not from hemorrhage, which is rare, but from collapse. In 93 cases, 70 died.

Death was rarely found to precede the birth of the child; about one-half of the children were stillborn; the actual birth of the child was unusually easy and there was no postpartum hemorrhage. If the patient lived through the puerperal period, the lochial discharge is so profuse as to be exhausting. An enlarged spleen is sometimes found during the puerperal period and is a very unfavorable sign. During pregnancy, 50 per cent. of the women having pernicious anemia died, and 50 per cent. of these cases aborted, probably from fatty degeneration of the placenta and maternal decidua. On examining children born of these mothers no evidence of pernicious anemia was observed; healthy children are sometimes born at about full term in these cases.

So far as *treatment* is concerned, if the mother is at or near viability, the disease well advanced and the child living, pregnancy should certainly be allowed to go to term for the sake of the child; nothing in such a case can be done for the mother. Opinions differ as to whether pregnancy should be interrupted in these cases, it is probably true that early in the disease life may be prolonged, and in some cases a cure effected, by stopping the pregnancy. When disproportion exists between the hemoglobin percentage and red cells, pregnancy should be ended.

The writer reports a case illustrating the important part played by foci of infection in the tonsils and alveoli causing pernicious anemia.

The interruption of pregnancy was advised and abdominal section was performed. The tonsils were infected. Petersen³ reviews the literature of pernicious anemia in pregnancy. This does not develop until the last half of gestation and pregnancy itself is the cause of the anemia. Of the writer's 3 cases, and of the 6 reported by Esch, and in other cases on record, none had shown symptoms of anemia at any previous time. In a very few the condition disappeared after labor, but in the greater number it rapidly progressed to a fatal conclusion. The patients themselves usually ascribed their bad feeling to the fact that they were pregnant.

The first symptom noticed is pallor, which grows more pronounced daily until the skin has a yellowish tinge. Some patients show a tendency to severe nosebleed, hemorrhage into the retina and petechial spots, and the mucous membranes are blanched. The legs are often swollen and there may be sufficient fever to mislead in the diagnosis. Diarrhea and vomiting are often seen and in the blood serum bilirubin is found and in the urine urobilin, both caused by the destruction of red corpuscles.

The mortality ranged from 70 to 50 per cent., in Petersen's cases two of the three women died, the third recovered after the artificial interruption of pregnancy. The writer insists that pregnancy should be arrested. While treatment is usually useless, good results are reported from intramuscular injections of defibrinated human blood.

Pregnancy Complicated by Exstrophy of the Bladder and Split Pelvis. Miller and King⁴ report the case of a negro woman, in good general health, admitted to the hospital six months pregnant. The vagina was very short and the cervix just within the orifice; later the cervix protruded and became eroded. There was exstrophy of the bladder, and the pelvis was split in the anterior wall. The patient came into labor and was delivered by forceps of a living child. There were slight lacerations which were repaired. The patient afterward returned suffering with prolapsus of the uterus and exstrophy as well. The patient refused treatment.

In the cases reported in the literature, all of the patients had to have assistance in labor. In some, the tissues were incised to promote delivery; in some, there was considerable laceration, but puerperal septic infection did not develop. Prolapsus of the uterus developed after labor. In the majority of cases, operation was performed by dissecting away folds of skin which were used to cover the gap in the anterior abdominal wall.

Surgical Conditions Complicating Intra-uterine Pregnancy. Mussey⁵ described the experience at the Mayo clinic in surgical conditions occurring in women having intra-uterine pregnancy. In 10,000 abdominal operations on women, there were 253 pregnant women who had definite surgical lesions not dependent on pregnancy. Of this number, 138 were advised to submit to operation and 123 were actually operated upon. The case histories of 23 were not considered because there arose a doubt as to the diagnosis of pregnancy, so that 100 cases remain for

³ Archives Mensuelles de Obstetrique et de Gynecologie, January to March, 1918.

⁴ American Journal of Obstetrics, August, 1918.

⁵ Ibid., May, 1918.

study where the conditions were already plain. Among these 100, 16 women were operated upon and the pregnancy had not been diagnosed. One of these had gone to three months, the remainder were under two months, and diagnosis of pregnancy was made at the time of operation. This diagnosis was later substantiated by reports from the patients except in 3 instances in which it was found to have been a mistake.

During the same time there were 130 pregnant women with surgical complications who did not come to operation; among these were 10 cases of colicystitis, 17 of fibroids, 15 with gall-stones, 31 of adenoma of the thyroid, and 31 of appendicitis.

Appendicitis is a frequent complication of pregnancy and dangerous to the mother and child, 1.9 per cent. of pregnant patients have appendicitis. Appendicitis does not occur in pregnant more often than in non-pregnant women, but women who have once had appendicitis, and afterward become pregnant, are apt to have appendicitis become very acute. When the pregnant patient has an acute attack, operation should be done much more quickly than in the non-pregnant. The danger of abortion, or general peritonitis following rupture, is greatly increased, and the mortality rate is higher. It is estimated that a mortality rate of 77 per cent. occurs in cases of acute appendicitis in which operation is not done. Most of the cases operated upon, 27 in number, were of the interval type, and the decision to operate in these cases was very difficult. In the 100 cases, there were 9 miscarriages, 2 occurring in patients dying from other causes. A conservative estimate places the frequency of abortion among private patients at from the fifth to sixth month.

Of 50 patients operated upon within three months' gestation, 14 per cent. aborted. At forty-five years of age, between three and five months, 4.4 per cent. aborted.

The complication next in frequency to appendicitis in pregnancy is *gall-bladder disease*. In 2215 women having gall-bladder operations during this period, 26, or 1.17 per cent., were pregnant. A patient having cholecystitis or gall-stones which are not presenting dangerous symptoms should not be operated upon during pregnancy. In the 26 gall-bladder operations during pregnancy, 2 died and 1 miscarried.

Pelvic tumor is a very important surgical complication in pregnancy. In this series there were 8 operations, and 18 in which operation was not done. The decision to operate, or not to do so, depends largely on the nature of the tumor. Unless the fibroid tumor is in a position to obstruct the delivery of a child, or presenting dangerous symptoms, it should not be disturbed during pregnancy. If it is in a position to render labor difficult and dangerous, a Cesarean section at term will probably produce the best results.

Myomectomy in pregnancy is not often necessary, while a probable operation is also highly dangerous. During one clinic, 20 patients with fibroid tumor came for examination, of whom 3 were operated upon, and 1 of these miscarried.

Ovarian tumor complicating pregnancy is decidedly dangerous. The

danger arises from twisting of the pedicle causing abortion or obstructing delivery. In papers upon the subject, a maternal mortality of 26.3 per cent. is quoted; the miscarriages occur about equally in the first and second half of pregnancy. In patients treated expectantly, 18 per cent. aborted, of whom 12.3 per cent. were operated upon. Even during the latter half of pregnancy some observers believe that operation should not be done. In 253 cases in the Mayo clinic, there were 6 ovarian tumors, of whom 5 were operated upon successfully, a single ovary being removed in each case. In 1 there was an ovarian abscess, and it and the tube were removed. In 1 case in which the diagnosis had been made of large ovarian fibroid, at operation the patient was found to have an ovarian cyst eight weeks after a normal labor. One patient had diagnosis of sterility, and a very early pregnancy was not recognized, and operation performed; the pregnancy was not interrupted, the patient securing needed help.

Two radical *breast amputations for carcinoma* complicating pregnancy were done; in 3 other patients adenoma were removed from the breast, but none of them miscarried.

The total number of women examined with *exophthalmic goitre* was 1055. Thirty-one were advised to delay operation until after confinement. It was estimated that 6.05 per cent. of women having thyroid disease were pregnant.

The writer concludes that no operation which can be postponed until after confinement should be performed during pregnancy. Operations for appendicitis do not incur much risk to mother or child. Removal of ovarian cysts during pregnancy is less dangerous to mother than is the so-called expectant method. The time most favorable for operation is believed to be in the first half of pregnancy when necessary.

Diseases of the Gall-bladder Complicating Pregnancy. White⁶ reviews the published account of cases and contributes an account of his own. The patient was aged twenty-two, married one year. At seventeen she had had an attack of pain in the right hypochondriac region, with vomiting and tenderness. She was admitted to the Jewish Hospital and operated upon for gall-stones, a number having come away. A number of stones were removed, but no condition was diagnosticated to account for the pathological condition present. Two weeks after this operation the patient became suddenly jaundiced, she was again operated on and bands of adhesions were found to be the cause of the obstruction; the adhesions were freed and the woman made a complete recovery. Five years later she was admitted to the hospital supposed to be in labor. She stated that this was her first pregnancy and that she had menstruated last about nine months previous. She had suffered much from vomiting through the pregnancy, and this had become much worse during the past few weeks. Six weeks before admission, she began to have pain in the region of the gall-bladder, which gradually spread over the entire abdomen; she then became jaundiced. Pain and jaundice both increased, the pain being so severe that the patient believed herself in actual labor.

⁶ American Journal of Obstetrics, May, 1918.

On examination there was tenderness over the gall-bladder, the cervix was long and hard, the perineum very firm, the os admitted only the tip of the finger. The fetal head was at the brim, and there was no evidence that the woman was in labor. It was decided to wait, hoping that labor would develop. Examination of blood showed 7800 white cells. The urine contained no albumin, but contained bile. At the end of twenty-four hours the patient seemed to be in collapse, with very rapid pulse and respiration; accordingly, the patient was delivered by abdominal section, the child being stillborn. The incision was then carried upward and the gall-bladder exposed; it was found to be enlarged to three times its usual size, with many firm adhesions. It was opened and drained of mucopurulent bile. The patient made a good recovery.

Pregnancy Complicated by Uterine Fibroid. Polak⁷ reports the case of a woman, aged forty-one years, a multipara, who complained of pelvic pain, difficult defecation and metrorrhagia. The patient had had pulmonary tuberculosis and had been in a sanitarium for two years; she was discharged with healed lesions in the upper lobe of the left lung. Her last pregnancy had been followed by sepsis which kept her in bed six weeks. Her last regular period had been six weeks before examination. She complained of obstinate constipation and there were varicosities and edema in the left leg, and almost continuous vaginal bleeding. Upon examination the cervix was displaced above the symphysis and an incarcerated movable tumor filled the entire pelvic basin. A diagnosis of incarcerated fibroid was made. Section under morphine and scopolamine with gas revealed a pregnant uterus, forced out of the pelvis by the tumor; a diagnosis of pregnancy had not previously been made. Panhysterectomy was done because of the patient's pulmonary condition, and she made a good recovery. A second patient, aged forty-one years, married one year, pregnant four months, had an abdominal tumor reaching to the tip of sternum. The tumor was smooth, hard, and was attached to the left posterior surface of the uterine fundus (very sensitive, had grown rapidly). Vaginal examinations showed the cervix elongated and passing between two tumors firmly incarcerated in the pelvis, the tumors were causing cardiac and respiratory distress. The tumor at the fundus and the cervical tumor were removed by myomectomy. The patient recovered without fever but developed a partial intestinal obstruction which was relieved by starvation, lavage and enemata. She later came into the hospital in labor, with the head in the pelvic cavity. Labor pains were violent; the fetal parts could be easily palpated over the left fundus through the thinned-out myomectomy scar and abdominal mass. As labor did not proceed and the tissues at the fundus became more and more thinned, the patient was delivered by Cesarean section and the uterus then removed. The patient made a good recovery.

Goitre Complicating Pregnancy. Watson⁸ quotes the frequency of goitre in pregnancy as 1 case in 15,000 dispensary cases, while in the private practice of the same physician there were 12 cases in a very

⁷ American Journal of Obstetrics, May, 1918.

⁸ Journal of the American Medical Association, September 14, 1918.

much smaller number of patients, while another observer in 30,000 dispensary cases saw 2 cases. Seitz, in 1913, collected 112 cases. Watson reported 7 cases of toxic goitre with exophthalmos and 9 cases of toxic non-exophthalmic goitre. Experiments upon animals show that various conditions may produce goitre, usually some circumstance or condition which deprives animals of iodine is responsible for the development of goitre. Clinically, the thyroid is often enlarged during pregnancy, and this enlargement is greatest in patients living in goitrous localities. In the region of the Great Lakes, a noticeable enlargement of the thyroid gland in pregnancy is present in about 4 per cent. of the cases. In 60 per cent. of these cases the symptoms were aggravated by pregnancy. The majority of the cases occurred in first pregnancies and the symptoms usually subsided after labor, and were less severe with succeeding pregnancies. When it appears among multiparas it is on the average at the fifth pregnancy. The occurrence of goitre in some form of toxemia of pregnancy is well known.

The subjective symptoms are most pronounced during the first two to four months, after this time improvement usually occurs or the symptoms increase and hyperplasia develops with or without exophthalmos.

The majority of surgeons dislike to operate upon pregnant patients who have goitre. The writer has had good results by injecting quinine and urea directly into the gland, this is without danger to the mother or child. What is needed in these cases is rest, with medical, dietetic and hygienic measures to suit the needs of each patient. When the patient has thyroid insufficiency or kidney disturbances, thyroid extract should be given continually throughout pregnancy in doses suitable for the patient, and should not be stopped before labor, even though symptoms improve. In hyperthyroidism, if the patient grows steadily worse, it may be necessary to empty the uterus. The danger of eclampsia must always be kept in mind. The ammonia coefficient in the urine is a useful index to impending eclampsia, and when this reaches 15 per cent. or more, the uterus should be emptied unless the ammonia nitrogen can be reduced. Blood-pressure should be carefully watched throughout pregnancy. Cesarean section is especially valuable.

Four cases are reported treated by quinine and urea, none of them were subjected to operation. In one case under the observation of the reviewer, and published by him, the patient had lost children and had had complicated pregnancies, but the condition of the thyroid gland did not excite attention. During the pregnancy in question, she was much nauseated and greatly depressed bodily and mentally. The urine was examined frequently, and, by hygienic measures and rest, the patient was carried into the ninth month of pregnancy. When the nitrogenous metabolism began to fail and the patient began to suffer from severe attacks of dyspnea, it was thought best to terminate pregnancy, which was done by elective Cesarean section. The mother and child recovered, and the mother was able to nurse the child for some time after its birth. Subsequently, the patient had the thyroid gland removed, and has since remained in fairly good health.

Infection by *Bacillus Coli Communis* Complicating Pregnancy, Labor and the Puerperal State. Davis⁹ draws attention to the fact that infection by the colon bacillus in pregnant women is recognized as a frequent occurrence. The diagnosis can be surely made by pathological examinations of the urine, revealing the *Bacillus coli communis*, the acid urine swarming with bacilli, the high percentage of serum albumin and casts make the picture a clear one. In some cases the leukocytosis reached as high as 20,000 or 30,000. While many cases of infection of the kidney get better very slowly, the mortality for mother and child is excessively high.

A differential diagnosis must often be made between colon bacillus infection of the kidney and muscular rheumatism or lumbago. The question of vaccine in the treatment of this condition, especially during pregnancy, is still under discussion. In many cases a skilful physician catheterizing the ureters can determine, by examination of the specimen thus obtained, which kidney is most at fault. When this fails to improve the condition, drainage of the kidney, through an incision in the loin, has proved of decided value. As a rule, abortion or premature labor does not follow the operation. The physician must always be careful not to give a favorable prognosis for the child if it should be born living, infants may die of toxemia, with, or without, eclampsic convulsions, as late as ten days to two weeks after their birth.

In addition to colon bacillus pyelitis, the writer calls attention to colon bacillus infection of the appendix and of the mucous membrane of the colon. This is more than the ordinary appendicitis and at operation not only may the lining of the colon be found infected, but throughout the small intestines, patches of ulceration may be seen beneath the peritoneal coat. If this process is severe, and widely disseminated, its result will be fatal. It is the writer's belief that pregnant women and parturient women, becoming infected, should be treated in the same manner in which the non-pregnant receive attention.

A third variety of the *Bacillus coli communis* complicating pregnancy is in the gall-bladder. While operation upon the gall-bladder is to be avoided during pregnancy, it is the writer's belief that this should be the case. He would drain the gall-bladder or perform extirpation in the pregnant patient for the same reason that would justify this operation in the non-pregnant. It is sometimes necessary to combine this with Cesarean section as in a recent case of the writer where a primipara had colicystitis so severely that it was necessary to interfere promptly. As she was at term, the uterus was first emptied by abdominal section, the appendix removed and finally the gall-bladder drained. The result of the operation was satisfactory, the patient showing no evidence of shock or depression.

Pregnancy Complicated by Double Uterus. Mazzini¹⁰ reports the case of a primipara, aged twenty-two years, whose previous history was good. She was brought to the hospital with labored breathing, pale, with a face indicating abdominal pain. The pulse ranged from 120 to 130,

⁹ Southern Medical Journal, December, 1918.

¹⁰ Journal Semana med. Buenos Aires, 1917, xxiv, p. 630.

with subnormal temperature, intense thirst, pyrosis and vomiting. The abdomen resembled pregnancy at term, the fundus of the uterus was on the left side and the uterus was irregular, three cornered in form, the size of the uterus did not correspond with the period of gestation and the upper segment was absolutely dull on percussion. Palpation was impossible over the lower part of the abdomen because of distention. The patient said that two hours before coming to the hospital, the abdomen had greatly enlarged in size.

Examination showed double uterus and vaginae. The abdomen was opened in the median line and the pregnant half of the uterus seemed to be at term, very dark in color and twisted upon itself; the other half of the uterus was laterally rotated. The pregnant half of the uterus was removed, pedicles sutured and covered with peritoneum. The patient made a good recovery.

Upon opening the tumor, it was found that the placenta had partly separated, that hemorrhage had occurred into the substance of the uterus and that the fetus had died.

Pregnancy of a Double Uterus with Torsion of the Pregnant Portion. Matzinni¹¹ observed an interesting and unusual case in a primipara brought to the hospital dyspneic, pale, and evidently with some very severe intra-abdominal condition. The tongue was dry, there was intense thirst, pyrosis and vomiting. The abdomen gave the impression of pregnancy at full term, the fundus of the uterus was in the hypochondrium and in the left flank. Examination showed a septum commencing at the vulva and continuing upward, giving the appearance of two vaginae. A diagnosis of double uterus and vagina was made. On opening the abdomen the half of the uterus pregnant was as large as term, intensely red in color and with torsion of 180 degrees. The pregnant portion of the womb was removed and the remainder was saved. The patient made a speedy recovery.

Pulmonary Edema during Pregnancy. Mellwraith and Scott¹² report 2 cases of this condition. The first was a primipara, aged forty-two years, who had considerable nausea daily, but little vomiting. She was in early pregnancy. With but very little warning, the urine suddenly became highly albuminous and the patient was found to have a systolic pressure of 240. She had had very slight headache, no eye symptoms, no epigastric pain, but slight swelling of the feet and ankles. Pain developed under the right shoulder-blade. She was sent to the hospital and eliminative treatment began, when, during the night, she suddenly developed pulmonary edema. Treatment was absolutely without avail. Convulsions did not develop, but the patient died.

The second case was in her second pregnancy, with systolic pressure of 210 and slight edema of the feet. The urine was albuminous, with granular casts and a large number of bacilli. The patient was sent to the hospital and given active treatment, but pulmonary edema developed and she became cyanosed. Venesection was performed and sixteen

¹¹ Surgery, Gynecology and Obstetrics, July, 1918.

¹² Ibid., October, 1918.

ounces of blood withdrawn, after which she was given morphine and camphor in oil. The patient's difficult breathing was relieved by puncturing the membrane and giving $\frac{1}{8}$ grain of morphine. She grew somewhat better until the following day, when, under local anesthesia, she was delivered by section of a living child. The mother's condition did not improve and death soon followed.

Ectopic Pregnancy. ABDOMINAL PREGNANCY. Acharya¹³ reports the case of a woman, aged thirty-eight years, who had an abdominal tumor slowly, but steadily, increasing, and bloody vaginal discharge. She had had seven children, and an abortion eighteen months before admission. Six months after the abortion she had amenorrhea for ten months, after which the growth of the tumor and discharge began. Upon opening the abdomen to remove the tumor, a sac, adherent to the anterior abdominal wall, was found, containing a mummified fetus; on removing this fetus and placenta, another sac was found adherent to the posterior aspect of the first; this contained a similar fetus and placenta which was removed. The uterus was not enlarged. The patient made an uninterrupted recovery.

Polak¹⁴ describes the case of a patient who, when two months pregnant, had a severe attack of abdominal pain and collapse but without vaginal bleeding. She remained in bed three days and then resumed her usual life. Eight months afterward she had a severe attack of abdominal pain, vomiting, and symptoms of an acute condition in the abdomen. She was transferred to the hospital and the abdomen was found considerably distended, tympanic over the entire left side. The right upper quadrant was tense, tender and dull in the flank. No well-defined uterine tumor or uterine contraction could be found. The child could be made out on the right side, the heart sounds were easily heard to the right of the median line of the umbilicus, and the entire fetus could be very readily palpated. Under anesthesia a small uterine tumor, the size of a two months' pregnancy, could be made out just behind the pubis. The cervix was open and the interior of the uterus could be digitally explored and was found empty. The uterine mass was pushed upward, forward and to the left by the soft tumor mass continuous with the fetal tumor felt on the right side. Operation was performed and the fetus quickly and readily delivered through the abdomen. The fetal sac was adherent to the anterior parietal peritoneum, and rupture of the sac at the upper right corner had taken place. This was closed by adherent intestinal loops. The placenta was attached to the base of the posterior surface of the left broad ligament, which, with the uterus, made part of the left anterior envelope. A large sinus was at the site of the placenta at the base of the right broad ligament. This sinus was tied and the placenta removed. Two vessels at the base were so situated that they could not be tied; these were clamped with hemostats and the clamps brought out through the abdominal wound. The entire sac was isolated and lined with a

¹³ *Surgery, Gynecology and Obstetrics*, September, 1918.

¹⁴ *American Journal of Obstetrics*, December, 1918.

Mikulicz bag which was loosely packed with strips of gauze and the wound closed.

Abdominal Pregnancy at Term. Noble¹⁵ reports the case of a woman, aged forty-two years. Her last menstruation had been November 1, 1917. Finding that she had not menstruated early in December, she introduced a catheter into the uterus to bring on the flow. Following this she had a bloody, and then a purulent discharge. She stated that she was violently ill, with fever and a great deal of abdominal distress, pain, vomiting, distention and loss of weight. She had been too weak for operative interference and her condition had been variously diagnosed by those who had examined her. The patient had grown somewhat better but suffered from pain at night, sharp in character and referred to the lower abdomen. Upon examination, the abdomen was distinctly enlarged, but diffusely, no well-defined mass could be mapped out. Upon internal examination again, a marked purulent discharge was present, and a hard, globular body just above the perineum, behind the posterior vaginal wall, pushed it forward as in a rectocele. If the fingers were allowed to rest quietly against this body, movement was felt, and a diagnosis was made of a living fetal head outside the uterus. She was placed in the hospital so that treatment could be given to regulate the bowels. After two weeks she was allowed to go home. The period of natural labor was calculated as closely as possible and the patient then delivered by abdominal section. The fetus lay in the amniotic sac beneath the abdominal wall. The omentum and transverse colon were somewhat adherent. When the sac was ruptured, a well-formed, vigorous female infant was delivered crying lustily. A large placenta was attached to the mesentery at the posterior aspect of the broad ligament and the floor of the pelvis. The question of preventing hemorrhage from the separation of the placenta was solved by pressure. As part of the placenta was attached to the broad ligament, hysterectomy was determined upon as giving better and quicker control of the hemorrhage, and because the uterus was an infected organ. Veins at the site of the attachment of the placenta were ligated and the same procedure was carried out in the mesentery and other portions of the abdominal cavity. Mother and child made uninterrupted recoveries.

A Rare Case of Abdominal Ectopic Pregnancy. Lascano¹⁶ reports a case of a woman, aged forty years, in whom pregnancy began and proceeded apparently normally until a discharge of blood occurred; fetal movements then ceased. For some months afterward the woman had no trouble; the abdomen remained distended and she consulted a physician. He introduced a trocar into the right side removing a thick, bloody fluid. Menstruation resumed a month later and continued for three periods when the patient suddenly had severe pain in the region of the anus and spontaneously expelled a large quantity of the same thick, bloody fluid. The abdomen became normal in size, the general health improved and continued good for two years

¹⁵ American Journal of Obstetrics, December, 1918.

¹⁶ Semana Med., Buenos Aires, 1918, No. 25, p. 235.

although there was an irregular discharge through the anus, on one occasion after the discharge had been very painful, it was found to contain some particles of bone, ten days later a large fetal bone was passed, and some months later a frontal bone. The patient was then sent to clinic. Upon admission, examination by rectum showed in the fundus a mass from which a purulent secretion was issuing. Rectal palpation showed an opening in the right anterior wall about the size of a five cent piece with clearly-defined edge about 4 mm. thick. The examining finger felt a bony mass pressing against the opening which was identified as a tumor the size of a small orange. Interference was made through the dilated rectum and sufficient room obtained to extract the fetal bones. The cavity was curetted and treated by iodine and the woman made an excellent recovery.

It is thought that this was a typical abdominal pregnancy, progressing to full term and then the fetal mass, separating, found its way into the rectum.

The writer brings forth arguments supporting the choice of the rectal method of examining this patient. There seems reason for utilizing the rectum in delivery of these cases if the patient is not in good condition for prolonged operation through the abdomen.

DIAGNOSIS OF UNRUPTURED ECTOPIC PREGNANCY. Polak¹⁷ states that the diagnosis of unruptured ectopic pregnancy, or tubal abortion, should be made in the majority of cases. In his experience, a positive diagnosis can be made in over 85 per cent. of the cases. To do this a very careful history must be taken and a thorough physical examination made in each patient. Cases are much more easy of diagnosis where the ectopic pregnancy is ruptured and there is shock and hemorrhage.

Operative treatment should be instituted so soon as the diagnosis is made; if, however, rupture has taken place, the operation should be postponed until the patient has recovered from the shock which follows hemorrhage. After the rupture, morphine and absolute rest are the best agents for this purpose. When reaction occurs, operation can safely be done. The abdominal route should be chosen and the tube emptied or removed, the individual vessels in the mesosalpinx must be ligated so that circulation in the ovary may still be performed. When the tube is removed, the ovary is suspended by suture of the ligament to the round ligament and the raw surface at the top of the broad ligament is covered with peritoneum.

INTERSTITIAL PREGNANCY WITH TUMOR OF THE RECTO-VAGINAL SEPTUM. Curtis¹⁸ reports the case of a patient, aged twenty-seven years, who sought medical help because she had incontinence of urine. Her menstrual period was thought to be overdue. Upon examination, there was a cystocele and a soft mass in the right uterine horn. Two weeks later the mass was larger, boggy in character and located in the right tube. Operation was immediately performed. Upon opening the abdomen, an interstitial pregnancy was found. The fundus was markedly vertical, the round ligament lateral to the sac and the right tube inserted

¹⁷ Surgery, Gynecology and Obstetrics, September, 1918.

¹⁸ Ibid., May, 1918.

nearly one-half inch higher than the left. The portion removed comprised the right half of the fundus of the uterus, together with the uterine end of the right tube. The sac was about to rupture through the posterior wall of the fundus.

CAUSE OF TUBAL PREGNANCY. Gardiner¹⁹ has examined the Fallopian tubes from 20 pregnant patients and found that in these there were sufficiently long, undilated portions remaining between the pregnant tube and the uterus to make a block. In 8 of the 20 cases sections were also made from the tube opposite the pregnant one, all but one of the tubes showed the result of past infection, and this was associated with a large uterine fibroid. Section of the tubes showed enlargement of the cells making up the walls and the round-cell infiltration that is present in the uterine wall during pregnancy. The reaction of the normal cells and the reaction of the round-cell infiltration was greater in the wall of the pregnant tube than in the wall of the pregnant uterus. In some of the sections the round-cell infiltration was so intense as to indicate the presence of active inflammatory processes. Eight tubes were examined from patients in whom the pregnancy was present in the opposite tube, one of these was found normal, showing only the slight changes of normal pregnancy. One tube was filled with blood and one with pus. Four showed many adhesions between the folds of the mucosa supplying the lumen of the tube, up into the numerous channels of various sizes. Four of the tubes showed great growth in the connective tissue in the remaining folds, in two the bloodvessels of the wall of the tube were markedly dilated and filled with blood, round-cell infiltration was present in the walls of all of the tubes.

DOUBLE TUBAL PREGNANCY. De Rossas²⁰ reports the case of a patient who had double tubal pregnancy, and the ovum seemed to have become imbedded in both tubes simultaneously. One of them ruptured after a week or two, and this led to section, when the bilateral tubal pregnancy was discovered and successfully removed by operation.

HYPERNEPHROMA SIMULATING ECTOPIC PREGNANCY. Carey²¹ was called to a patient who, while eating, had been taken with severe abdominal pain and had fainted. On becoming conscious, vomiting and shock had developed. A diagnosis of ruptured ectopic pregnancy or occluded ureter had been made. Operation had been proposed and declined. Four hours later, while under the influence of morphine, the patient was still shocked, very pale, pulse 90. There was slight bloody vaginal discharge. No urine had been passed since the collapse. There was very little abdominal distention but, in the right lower abdomen from McBurney's point upward, there was a tender, smooth mass becoming deeper as it approached the margin of the ribs.

The history stated that four years previously the patient had ventral fixation of the right uterus, resection of the tubes and vaginal plastic repair. Since this operation she had suffered greatly at times from pain in the right side, and for three weeks the bladder had been very irritable.

¹⁹ West Virginia Medical Journal, 1918, No. 12, p. 370.

²⁰ Revista Medica Cubana, Havana, February, 1918.

²¹ American Journal of Obstetrics, September, 1918.

To hasten menstruation she had played golf for four days before the time of the period, and two days before she had driven fifty miles in a motor. Menstruation then began, but very slightly. A careful examination showed that no urine was passing through the right ureter. A diagnosis was made of hydronephrosis, probably caused by twisting of the ureter. Opiates were given and the position of the patient shifted at frequent intervals. The next day there was some improvement but again the right ureter could not be catheterized. The patient was then taken to the hospital where operation was subsequently done.

Hemorrhage was found behind the peritoneum, the kidney was edematous, and the hemorrhage had penetrated its substance; when the kidney was opened, it was found to contain a hypernephroma. This tumor had ruptured a vessel, causing considerable hemorrhage. The tumor was removed and, on examination, was found to be malignant. For some time after the operation there were no signs of recurrence.

EXTRA-UTERINE PREGNANCY FOLLOWING RESECTION OF THE TUBE AND INSERTION OF CATGUT TO KEEP IT OPEN. Tweedy²² describes the case of a patient operated upon for fixed retroversion, with very firm adhesions. Both tubes were affected, the isthmus of the right was occluded by several hard masses. The diseased portion of the tube was removed and end-to-end anastomosis was performed. The patient again applied at the hospital complaining of backache, menorrhagia and sterility. The uterus had again become retroverted and fixed. The second operation was easier than the first, for the adhesions were not so dense. No true union had occurred where the anastomosis had been made, the stumps lay at right angles one to another, and the orifice on both sides was completely closed; the occluded portions were cut away, and a piece of fine chromatinized catgut was passed through the fimbriated end of the tube and also through the uterine stump into the uterus. The uterine stumps were then drawn through the fimbriated extremity and sutured in position, and ampula thus lay over the uterine stump in the form of ferrule or cap. The left tube was not interfered with. Some time later the patient again came to the hospital suffering from pain and irregular hemorrhage, and the uterus was again retroverted. After opening the abdomen, the adhesions were easily broken down, the right tube liberated and brought into the wound. Examination of the mass at the tubes showed it to be a tubal pregnancy.

Tweedy has given considerable attention to this matter and has operated upon a number of cases. He uses a long, fine probe with an eye at one end, by which he is sometimes able to pass the gut into the uterus and out through its wall. He believes that salpingitis, with or without apparent occlusion of the tubes, constitutes the usual cause of sterility. Ordinary tube resection, with or without the formation of an artificial os, fails in almost every instance to provide a permanent passage to the uterus. Failure to transmit the products of conception may be present in a tube which shows no gross abnormality. The lumen of the tube can with certainty be kept open by insertion of catgut through the lumen.

²² Surgery, Gynecology and Obstetrics, December, 1918.

The shorter the tube is made, the less likely will it be that the lumen will arrest the passage of the ovum. The loss of peristalsis will cause the arrest of the ovum in the tube and predispose to tubal pregnancy. Chromic or iodized catgut, which is employed to keep the tube open, is likely to cause salpingitis, with consequent loss of peristalsis.

The future care of female sterility is now largely the question of improved technic, for procedures are based on a definite knowledge.

Urinary Infection during Pregnancy and the Puerperal Period. Smith²³ finds that the greatest symptom in these cases is the toxemia. So far as local examinations are concerned, the high leukocyte count, abundant pus in an acid urine, with colon bacillus in pure culture, make the diagnosis complete. Pain may be a very confusing symptom and may suggest pleurisy, as the inflamed kidney moves painfully when the patient breathes. Pressure on the inflamed right ureter will often produce pain like that of appendicitis. Sometimes the infected kidney is blocked so that catheterization of the ureter may fail to obtain urine from this kidney. In pyelitis the symptoms may suggest acute appendicitis, salpingitis or puerperal infection.

The greatest confusion is between colon bacillus infection, and, in a puerperal patient, puerperal septic infection; however, the greatest difficulty in diagnosis lies between infection of the kidney and appendicitis, in both there are chills, septic variation in temperature, and pain, usually more apparent in a renal case than in one of appendicitis. The writer strongly commends direct local treatment to the pelvis of the kidney and surrounding tissue through cystoscope and ureteral catheter, distention of the bladder to its physiological capacity while the patient reclines with only the head above the plane of the bed. This reduces congestion in the pelvis of the kidney, stimulates secretion and modifies the urine.

In the writer's experience, urotropin has not been valuable in infection of the upper urinary tract, largely because it is almost impossible to get the urine acid enough to decompose this drug. When the infective agent is the colon bacillus, rendering the urine alkaline with potassium citrate has done great good. Urotropin and potassium citrate should not be given at the same time, as one tends to render the urine alkaline and the other acid. If a sensitized vaccine of the colon bacillus can be obtained, this may be used with benefit.

In cases which resist this treatment, drainage of the kidney may be necessary. Pus may be in the urine for some time after the patient has recovered and should occasion no alarm.

The Toxemias of Pregnancy. Dorman²⁴ describes typical cases of pernicious nausea, toxemia of pregnancy accompanied by separation of the placenta, sudden overwhelming toxemia resulting fatally, and acute hepatic toxemia with hemorrhage. These cases illustrate the various phases of the subject.

He believes that toxemia of pregnancy should include all cases of disturbed metabolism with toxic results. Mild cases are often unrecog-

²³ Surgery, Gynecology and Obstetrics, September, 1918.

²⁴ American Journal of Obstetrics, April, 1918.

nized, and have tachycardia, syncope, hyperemesis, ptyalism, headache, neuralgia, indigestion, mental depression and excitation, nervousness, chorea, insanity, and dermatitis, such as herpes, erythema and impetigo. The growing child and its influence on the metabolism of the mother is the cause of the toxemia of pregnancy. While the exact cause is unknown, it seems probable that a proteid substance, originating in the placenta, enters the circulation of the mother and, if not neutralized or eliminated, causes poisoning. The uterus itself is not a source of the ordinary toxemia of pregnancy.

Recent studies relating to the origin of toxemia indicate that an anaphylactic source, and also the fact of interrelating glandular activity of the organism, may account, in some instances, for the origin of toxemia. Individuals differ in susceptibility and power of resistance. While in usual cases, pregnancy disturbs the balance of gland activity, in thyroid deficiency it may act as a stimulus.

Toxemia usually begins with some temporary burden of elimination, probably most frequent due to over-eating. Hospital cases, in whom the stomach is thoroughly emptied by irrigation, afford a frequent example of decomposing toxic food in the stomach. The pathology of fatal cases in the early or later stages of toxemia is strikingly similar; it is probably impossible to distinguish, by examining postmortem, between the types of toxemia causing death and those followed by recovery. Usually, in pernicious nausea and vomiting, the liver is most affected.

The writer divides cases into those of *mild toxemia*, *pernicious nausea and vomiting*, *preëclampsic cases* and, last, *eclampsia*. The mild cases are significant because they may be followed by severe toxemia; they are usually associated with constipation, indigestion, flatulency and hyperacidity, with diminished urine, sometimes showing albumin and often indican. In some cases there is anemia. The blood-pressure in most cases goes to the high limits of normal, 130 or more. The treatment of this condition consists practically entirely of a hygienic method of living. In the early months, fatigue toxins are particularly common, and are often connected with pernicious nausea of early gestation, and with beginning acidosis. In those cases of vomiting which are obstinate, much relief is given by a strictly limited diet. Such patients should be fed small quantities of easily digested food every two or three hours. It is of the utmost importance that the diet be absolutely controlled and constipation avoided.

In regard to *pernicious nausea*, while it may occur at any time during pregnancy, it is most frequent in the early months. In the last third of pregnancy a severe toxemia is much more apt to be eclampsia. The onset may be insidious, and it may be very difficult to distinguish the severe from the mild form of the disease. In the severe cases the patient is overwhelmed so rapidly that there is not even time to induce labor. Other cases develop even more suddenly and may proceed rapidly to a fatal issue. There is epigastric pain, the urine is diminished in quantity, containing albumen and changed in the ammonia coefficient, this last is important because it gives the means for making a positive diagnosis of acidosis.

If the case is slowly progressing, the first evidence is a weaker pulse, while the temperature, which has been subnormal, slowly rises to a very slight elevation. Sometimes, in patients whose tissues are relaxed, it is possible to map out a change in the position and size of the liver. Pernicious nausea is not of the most malignant type and may be improved under treatment, even to recovery.

Nature may terminate pregnancy from exhaustion. The most important thing in this diagnosis is to recognize the time for interference. With the death of the fetus, symptoms disappear, even before spontaneous abortion occurs. In the chronic cases there is danger of treating the patient too long for the toxemia; when icterus is present and the patient may seem to change very little, the chance of destruction in the cells of the liver is so great that if delay be practiced, a fatal issue may result. The patient should be given fluid with sodium bicarbonate very freely by bowel or by hypodermoclysis.

In cases of severe vomiting the patient may suddenly improve. Injection of corpus luteum extract is occasionally followed by very prompt improvement and this has led to the claim that corpus luteum extract is almost specific; abundant experience, however, does not bear this out.

The treatment of pernicious nausea and vomiting consists in checking acidosis by diminishing food, increasing elimination and securing physical and mental rest. Pregnancy must be interrupted where there is blood in the matter vomited and jaundice begins, with increasing rapidity of the pulse.

In emptying the uterus in the early months, dilatation and curetting is the operation of choice. In the second third of pregnancy the writer has had good results from using preliminary tampon of the cervix. In the last third of pregnancy the use of a bag for dilatation is often of great value. When speed is very important, vaginal hysterectomy is the operation of choice.

It is of the utmost importance to modern medical science that the *preëclamptic toxemia* should be promptly recognized, for this usually gives time for treatment. Usually, the urine contains a heavy cloud of albumin, both urine and urea are decreased in quantity, hyaline and granular casts are present. Blood-pressure is increased, headache develops and there may be marked edema; there is disturbance of sight, with flashes of light or diminished vision; the nervous system is disturbed, there being irritability and nervousness, or dulness and sleepiness; gastro-intestinal disturbances vary from flatulence and lack of appetite to marked nausea and vomiting. These cases, if not treated vigorously, will surely end in eclampsia. Nature's effort at cure is destruction of the child to save the mother, this is accomplished through pathological changes in the placenta, which may occur in successive cases, the mother finally making a perfect recovery. It is a curious clinical fact that patients with much damaged kidneys, and with high blood-pressure will often pass through successive attacks of toxemia and will remain in better condition than those in whom the toxemia is comparatively recent.

So far as prevention goes, pregnant patients must be closely observed and have proper dietetic and hygienic instructions. The importance of elimination through the bowels, kidneys and lungs cannot be overestimated. When the patient becomes highly toxic but still without eclampsia, she should be placed in bed and allowed only a milk and water diet. Sweating and irrigation of the colon should be regularly and vigorously employed. Blood-pressure should frequently be taken and recorded; if this tends to decrease, the patient is improving. If, in spite of energetic treatment, improvement does not occur, pregnancy must be terminated.

When *eclampsia* is about to occur, there is usually warning; if, at this time, the patient be taken and subjected to prompt and thorough treatment it may still be possible to avoid convulsions. The description of the convulsion is identical with that of epilepsy. Edema of the lungs is the greatest danger threatening the woman who has passed through eclampsia.

The writer believes that the first and most important treatment is the emptying of the uterus to get rid of the source of the poison. At the present time, opinion is considerably divided upon this point; many urge that the uterus remain unmolested and that attention be given to securing general elimination. Probably the most injurious method of emptying the uterus promptly is the old forced or violent delivery; this was done before the cervix was dilated when turning was performed and the child delivered with limbs preceding the head. Even in most skilful hands this method was followed by serious lacerations and sometimes by fatal hemorrhage.

To control to some degree the convulsions, the writer has seen good result from hypodermic injection of morphine or from *veratrum viride*. Chloral hydrate was formerly given extensively, and nitroglycerine has also been employed.

During the actual convulsion all that can be safely done is to loosen the patient's clothing, put her upon the back or side. No anesthetic will stop the convulsion if it once has begun. If the patient is to be controlled at all during the paroxysm, it must be by the inhalation of chloroform. Copious irrigation of the stomach and intestines is of the greatest value with other precautions. Bleeding and intravenous injections of saline are sometimes employed. Stimulation is occasionally necessary when the patient is greatly depressed. As the patient recovers, she must be urged to drink water in abundance, and the diet must be limited. The writer estimates that eclampsia, if treated as suggested in his paper, will give a mortality of not more than 10 per cent.

Mosher²⁵ describes typical cases of the various stages of toxemia of pregnancy and reviews the literature of the subject. He describes several cases of pernicious nausea, in some of these corpus luteum extract seemed to exert a favorable influence. He draws attention to the value of a balance diet and believes that a common mistake is made in reducing the patient's food rapidly to the lowest possible point. When induction

of labor is threatened, he has employed Hager dilator and also the Voorhees bag No. 4. Repeated lavage of the stomach with sodium bicarbonate, and also lavage of the large intestines is given.

Hüssy,²⁶ has made a *comparative study of the serum of normal women, those pregnant and those not pregnant, and of women with severe toxemia of pregnancy*. He tested them on a rabbit's ears. A glass tube was introduced into the artery of the woman and then into the vein of the ear, and the serum allowed to flow through. The number of drops per minute issuing from the vein is recorded on a drum, an index of the vasodilating or the vasoconstricting action of the serum. The influence of various drugs was also studied. The absolute number of drops was not recorded, as they varied in different ears. The important point was the difference between the drops by the normal serum, the pregnant serum, and the toxicosis serum. In the 20 tests made, the number of drops was always more numerous with pregnant than with non-pregnant serum. In the serum from the pregnant woman with eclampsia, there was a marked vasoconstricting action. The number of drops fell to 5 in comparison to 25 drops in pregnant serum, and 13 in non-pregnant serum in a given period. After eclampsia had subsided, the number of drops was found normal again. An even smaller number of drops was found in pregnancy, toxic kidney disease or dermatoses. With the uncontrollable vomiting of pregnancy a similar action was present, but much less pronounced than in any other pregnancy toxicoses. This research would suggest that the etiology of pregnancy hyperemesis seems different from that of eclampsia and other pregnancy toxicoses.

Tests of the remainder on the intestines showed remarkable vasoconstricting action in the blood serum in pregnancy toxicoses. Normal pregnancy serum had an opposite effect, causing dilatation of the vessels. It seems likely that these substances in pregnant serum which cause vessels to contract, are connected with the pituitary body, as they seem to have no relation to the suprarenals and the thyroid.

ANALYSIS OF THE BLOOD IN ECLAMPSIA AND ALLIED INTOXICATIONS. Slemons,²⁷ has made researches to determine the condition of the blood in cases of eclampsia and the toxemias of pregnancy. He finds that analysis of the blood, in cases of eclampsia and auto-intoxication, shows normal quantity of amino-acids and slight reduction of nitrogenous waste products, such as urea and uric acid. The blood-sugar increases after convulsion; in normal pregnancy and toxemia, the total fat is practically the same. In eclampsia, the cholesterol is increased, while the lecithin is lessened. The carbon dioxide combining power of the plasma is lessened during normal pregnancy which indicates a mild acidosis, and in the presence of auto-intoxication the variations commonly found are insignificant. The acidosis hypothesis is not supported by results of blood analysis, nor is the hypothesis that eclampsia is caused by derangement of protein metabolism. In the present stage of our knowledge the cause of eclampsia must be sought elsewhere.

²⁶ Correspondenz-Blatt für Schweizer Aerzte, 1918, No. 21, 49.

²⁷ American Journal of Obstetrics, 1918, No. 5.

THE TREATMENT OF THE TOXEMIA OF PREGNANCY. Strachan²⁸ believes that while the exact pathology of the toxemia of pregnancy is unknown, still there are fully developed conditions, such as nausea, vomiting, albuminuria, eclampsia and hemorrhage, which must be kept in mind and which afford us clinical examinations. Unquestionably, prevention is far more important than to cure, but, unfortunately, many cases do not come to the observation of physician until the toxemia is fully developed and then the most active treatment is necessary to successfully combat the disease. The writer believes in always terminating pregnancy in cases of toxemia which do not yield immediately to treatment and this should be done promptly and without delay.

The treatment of the various manifestations of toxemia should be essentially the same, namely, to secure elimination. Treatment may be called palliative or radical and operative. In the palliative treatment the use of sedatives is urgently indicated to lessen convulsions. Morphine is most potent of all, the dosage varies greatly, the writer gives $\frac{1}{4}$ to $\frac{1}{2}$ grain at first, repeating the smaller dose in two hours and again in two hours giving in all three doses, under careful observation. Chloroform is thought to be of much value in its proper place, it must be used briefly and under no circumstances should the administration be prolonged; chloral hydrate and potassium bromide are used to check restlessness between convulsions. The writer has never seen a really sedative effect from these substances in treating eclampsia.

The general surroundings of the patient are of great importance. A complete examination should first be made, and then the patient disturbed as little as possible. The principle of this treatment is to avoid everything that can excite or irritate the patient. The Stroganoff method is described at some length. To correct the increased blood-pressure, circulatory sedatives are much used by some, veratrum viride is the most typical drug employed for this purpose. Nitrites have been employed by some and amyl hydrate is used by others. In early pregnancy the toxemia must be attacked through the gastro-intestinal tract. Irrigation of the stomach, the withholding of food, and very careful feeding are essential. The great danger, however, in these cases, is delay until the patient is critically ill. Usually, this arises from the fact that the practitioner who sees the case endeavors to palliate the symptoms by the use of drugs which do not permit prompt elimination. Purgatives, sweating and venesection are used by the author for appropriate cases. Decapsulation of the kidney he has not employed. Emptying of the uterus, however, the writer considers the safest and best method of treatment in all cases where elimination is pressed.

Regarding the termination of pregnancy, the writer would dilate the uterus gradually and when this had proceeded satisfactorily, would incise the cervix, this incision should be closed by suture when delivery of the patient has been terminated. When the cervix is fully dilated, version by forceps will finish delivery.

Cesarean section, the writer believes, is unjustifiable in eclampsia and toxemia.

²⁸ British Medical Journal, August 3, 1918.

The writer has certainly presented a complete picture of the old and so-called classic treatment of the toxemias of pregnancy. His views concerning the uselessness of Cesarean operation will not bear close criticism, for it can be positively shown that in cases of rapidly increasing toxemia in the latter portion of pregnancy, immediate delivery by abdominal Cesarean section is often most successful.

Mortality among Women from Causes Incidental to Child-bearing. Dublin²⁹ believes that deaths of women from childbirth are of special importance because many are preventable and all occur at a period of life when each death involves serious social loss. His study is based primarily on the records of the Industrial Department of the Metropolitan Life Insurance Company. Over 14,000,000 women between the age of fifteen and forty-four were under observation during a period of six years, white as well as colored women were included, and nearly all States of the United States and Provinces of Canada were represented.

Most of these women were in industrial populations, including many foreign born. On the other hand, these women have the advantage of the Visiting Nurse Service of the Metropolitan Company, which treats over 40,000 cases of confinement during each year. The records are exceedingly accurate and thus give valuable information. There was a death-rate of 68.4 per 100,000 women, slightly higher among the negro than the Caucasian population. The most important cause was septicemia, 43 per cent. of the whole, next came toxemia with convulsion, 26.4 per cent. of the whole; together, these two conditions accounted for 69.4 per cent. of the puerperal cases.

Reviewing the entire series of statistics, it is found that there is one fatal termination in every 100 to 200 cases of pregnancy and childbirth. Thus, childbirth is second only to pulmonary tuberculosis in danger to life. Death of wives and mothers means, in many instances, the destruction of family ties. This fact explains the prenatal work which is now so extensively carried on in all large cities.

Some of the life insurance companies have established a visiting nurse system among parturient women whom they insure. These visiting nurses found that their cases contained 25 per cent. of diseases and conditions resulting from the puerperal state. Nearly 250,000 visits were made in one year to parturient women, either before or after confinement. A distinct fall in the death-rate of white female policyholders in the child-bearing age can be found following the visit of these nurses. Among negro women a still greater reduction was observed. These observations prove the value of prenatal care for pregnant women.

The matter is of interest, for it is known that in the six-year period, between 1911 and 1916, the death-rate among white women from conditions incidental to child-bearing has diminished 10.7 per cent.; among negro women the reduction is still greater. Among the white women the decline in mortality from puerperal septic infection was 17.3 per cent. These figures indicate the necessity for such work in its immediate employment to be of benefit.

²⁹ American Journal of Obstetrics, July, 1918.

Blood-pressure during Pregnancy. Danforth³⁰ has studied blood-pressure during pregnancy in both hospital and private patients. His observations include, first, a series of 115 private patients and then 332 hospital cases.

In the 115 private cases, 608 observations were made, the ages of the patients varied from twenty-two to forty-three. Blood-pressure examinations and urine examinations were made every two weeks during pregnancy until the last month when the study was carried on every week. In most cases a mercury instrument and armband of standard width were used, in a small number the Tyco was employed. The average systolic pressure was 114.

In this series only 1 patient gave a pressure under 100, and that was 93; 43 cases gave an average of 100 to 110, the average being 107; 48 patients gave an average pressure of 110 to 120, average being 114. In 26 the average pressure was over 120, being 129; 24 cases in the series where ages varied from thirty to forty-three had average pressure of 121.

Others who have studied this subject have obtained somewhat different results. Wallich and Judd found pulse tension increased during pregnancy. Haussling obtained an average of 113. All observers agree that a rise in blood-pressure is evidence of approaching toxemia.

In 245 cases the average blood-pressure on entering the hospital was 119; in 208 of these same cases in whom blood-pressure was taken immediately after delivery the average was 116. In 65 cases entering the hospital with average pressure of 156, in 59 of these after delivery the blood-pressure was 136. In all cases in which the pressure was 140 or more the histories were carefully looked up and letters addressed to their attending physicians. In some of these the blood-pressure had not been observed previous to entrance and hence no data upon this point could be obtained. In a considerable number in whom the blood-pressure had been carefully observed, it was found that it had been quite normal during pregnancy and up to a very short time before labor. It would seem, from this and other observations, that blood-pressure rises during labor and that we are dealing with hypertension incident to labor.

With one exception every case of true toxemia which entered the hospital while these observations were made, gave no elevation of blood-pressure, this case was a woman, aged twenty-four years, a primipara who had been under the writer's observation from the fourth month, she had been very careful in reporting regularly for observations and for examination of the urine. Both urine and blood-pressure had been entirely normal, the last observation having been made three days before she was admitted to the hospital in labor. Her blood-pressure was then 120. The urine obtained immediately on admission showed a faint trace of albumin by testing with nitric acid. The patient mentally was perfectly well, without headache, edema or visual symptoms of any kind. The child's position and heart sounds were normal. The patient was apparently progressing in a perfectly normal first labor. About eight hours after the beginning she left her bed to empty the bladder and fell

³⁰ American Journal of Obstetrics, June, 1918.

over unconscious. She soon became cyanotic and stuporous; the heart sounds could not be heard and in a few moments she had a severe convulsion. As dilatation was almost complete, she was rapidly delivered by axis-traction of a dead child. She made an uneventful recovery, but her urine showed a trace of albumin for many weeks. Such cases are exceedingly rare, but their existence cannot be denied.

While it is not possible to make statements covering all cases, still the blood-pressure of 140 during pregnancy may be looked upon with some suspicion; when 160 is reached the condition is that of threatened danger. If albumin is found by examination, a quantitative test should be instituted. When cases have a blood-pressure of 140 or more they should be subjected to careful observations at intervals not longer than two weeks, and preferably every four or five days. In many of these cases it will be found that the use of a saline every morning, with diet restricted to milk, cereals, vegetables and water, and a daily sweat bath, will be sufficient to reduce pressure.

Cases in which the blood-pressure does not fall but continues to rise are much more serious. With such patients the blood-pressure should be taken at least once a day. The total urinary output should be noted daily, with estimation of the total solids, urea and albumin and microscopic examinations.

If, under absolute rest and restriction of diet, the blood-pressure falls, cases have been allowed to go on under careful observation, this was especially true in those who had not yet advanced to the beginning of the ninth month, after that nothing is gained by attempting to continue the pregnancy. When the pressure reaches a dangerous height it is sometimes argued that pregnancy should continue in the interest of the child, but it must be remembered that the child shares the mother's toxemia and that its chance of life is not improved by continuing the pregnancy.

Attention is called to the fact that rise in blood-pressure is the first symptom of toxemia, and that it may be observed before the appearance of albumin in the urine.

The writer concludes from his studies that the average blood-pressure in pregnant women is less than that of non-pregnant; labor frequently causes a rise of arterial tension; the toxemia of pregnancy is accompanied by a rise in blood-pressure except in very rare instances, and this rise usually preceded other symptoms.

The reviewer fully agrees with the writer in his estimate of the importance of blood-pressure as a symptom of toxemia in pregnancy, but it must be remembered that in certain cases which may be classified as hepatic toxemia, and not nephritic, the blood-pressure may not only not rise, but may be abnormally low. These are among the most serious and intractable cases coming under observation, and a most guarded prognosis should be given concerning them. Again, many pregnant women are so apprehensive and nervous that during an examination the blood-pressure will rise considerably, and hence an accurate idea of their condition cannot thus be obtained. The reviewer has made observations of blood-pressure during delivery by abdominal section, there is a marked fall just as the uterus is emptied of its contents, but, if there

be no special blood loss, this is but temporary and the average is soon regained. Some of the drugs like ergot, in very common use, produce elevations in blood-pressure, and hence, in studying cases, one must be sure that this element is lacking.

CORPUS LUTEUM EXTRACT FOR THE CONTROL OF PERNICIOUS NAUSEA OF PREGNANCY. J. C. Hirst³¹ reports 111 consecutive unselected cases of pernicious nausea of pregnancy treated by intramuscular injections of corpus luteum. In mild cases the dose was 1 mil. every other day for five or six doses. In cases in which the nausea had begun to grow less the remedy had an immediate effect; in more severe cases in which nausea was constant and the patient had frequent paroxysms of vomiting, the dose should be 1 mil. daily for twelve to fifteen doses. During this time the patient should be kept as quiet and obtain as much rest as possible. In pernicious cases 1 mil. twice daily was given, and this could readily be exceeded; in severe cases 2 mg. might be given. The site of the injection was prepared by cleansing with tincture of green soap and alcohol, and the injection is given in the deltoid muscle. Alcohol is not a safe antiseptic to prepare the syringe for the use of animal extracts. Injections are given deeply into the muscle and not subcutaneously. After the injection, the tissues are gently massaged for several minutes. One-third grain of soluble corpus luteum powder, in 16 minims of physiological salt solution saturated with chlorbutinol for its alkaline antiseptic effect, is used. This amount is equivalent to 2.5 grains of desiccated corpus luteum. In the writer's experience there has been no abscess following the injection. Injection is often followed by a red and somewhat tender area around the site of puncture for twenty-four hours. The corpus luteum of sheep and cows and also that of pigs was used, and no difference was observed between the different preparations. The smallest number of doses in any successful case was 4, the largest 42. The average number was 11.

In the 111 cases, 65 were entirely relieved, 34 were so much better that after the usual twelve doses of extract the patient declined further treatment; thus 99 of the 111 patients were entirely relieved or made comfortable. There were 8 cases in which the extract had no beneficial effect whatever, in 4 cases the nausea was increased; all of these had well-marked goitre. Only 2 of the cases showed anaphylaxis. It was found that the risk of abortion was not increased, as only 4 of the cases of pregnancy aborted at that time.

In markedly neurasthenic cases the remedy seemed to exert a sedative action. The nervous symptoms, which had existed prior to giving the remedy, very largely disappeared. In all successful cases no other treatment was employed, so that whatever symptoms developed the writer could judge fairly of the effect of the remedy. The failures are described in detail.

The ideal material would be, of course, of human origin.

The Employment of Pregnant Women in Munition Factories. Deacon²² published a report of factories in which pregnant women were employed

³¹ American Journal of Obstetrics, March, 1919.

²² Lancet, London, 1918, p. 311.

in munition work. The buildings were situated in open, well-drained fields, the former site of a farm, with abundance of fresh air and sunshine. All buildings were thoroughly ventilated and the sanitation of the place was excellent. The factory was especially well managed. The buildings were a mile from any means of conveyance, and all the workers were obliged to walk this mile.

Of 101 pregnant women who worked in the factory, 46 cases had terminated successfully, with the birth of forty-seven children; 7 cases could not be traced, but were in good condition when last heard of; 34 cases had not been confined at the time of writing, but since then 19 had terminated successfully.

Among 101 patients there were 2 premature births and 13 early abortions. One of the premature cases had an operation for advanced cancer of the cervix at five months, and the other became syphilitic at six months, a dead child being born two months later. The 13 cases of abortion were all from five to ten weeks in pregnancy, 1 followed a fall out of bed, another a fall down stairs, the third was tuberculous and the fourth had had previous abortions. While it is true some patients may not have reported their condition, and it may not have been accurately noted, still the great majority were followed up at their homes, and what happened to them was accurately ascertained. Records are still being kept of each patient even after they leave the immediate place of employment. Those patients who have been followed up since the birth of children, report they have been in good health, and when they subsequently had children they have done well. One patient had already given birth to eight children not especially vigorous; in her ninth pregnancy she worked until ten days before confinement and gave birth to a vigorous, healthy child; another had had twelve pregnancies, but only one other living child. It was the universal experience that work did no harm and the walk to and from the factory was of positive benefit.

Adamson and Jones³³ state that up to a very recent time there had been no fixed method or procedure in dealing with women factory workers who had become pregnant. In some instances the condition had been ignored and the woman allowed to do anything which she pleased. In other cases, women were dismissed as soon as the condition of pregnancy was ascertained, without regard to their ability to work.

In carrying out routine medical examinations, examiners found that many women were hiding their condition to avoid dismissal at the fourth month of pregnancy; further, there was observed a considerable number of illnesses of short duration among munition workers which could be suspected to be caused by early abortion, although it was often impossible to confirm such a suspicion. The principal reason for illness among these women was their anxiety to keep their work and their earnings. An effort was made to approach the various employers to see if suitable work could be given to pregnant women;

³³ British Medical Journal, September 21, 1918.

this was absolutely refused. The grounds for the refusal were that such employment would cause firms to lose money and that it was an improper thing for pregnant women to work among others.

An effort was finally made by the superintendent of the National Ordnance Factory at Leeds to draw up a plan by which the conditions of pregnant women working in the factory could be improved. This plan was submitted to women representing the committee of regulation, treatment and employment of women, and were discussed with representatives of other unions and also representatives of the workers themselves. A prematernity plan was put on foot by which women themselves applied at each factory to their welfare supervisor to be enrolled for employment under the scheme. They filled in a form of application and signed an agreement to accept the wages offered. The factory medical officer examined all applicants and sent the report stating their condition and what work they could most successfully perform. This material was tabulated and kept on file.

As regards the choice of work, pregnant women were badly affected by night work; they complain bitterly of fatigue and are often obliged to relinquish the occupation.

As soon as women notified the officials of their pregnant condition they were given light work in the factory while still working on day or night shifts. They are not allowed to attempt heavy lifting or sudden strain. Automatic machines and electric cranes are operated without physical exertion, and are suitable for women. On reaching the end of the fourth month of pregnancy, women were transferred to light sedentary work at a factory engaged in the gauging and assembling of fuse parts. Their hours were from 7.30 A.M. to 5.30 P.M., with the usual intermissions for meals. They were given the less skilled operations in the factory and were paid the ordinary standard rate.

At or about the end of the seventh month such patients were transferred from the fuse factory to a general clothing store and sewing department; here the hours were from 9 A.M. to 5 P.M., with intermissions for meals. They were engaged in the mending of the rough clothing of the troops. The last hour of the working day was given up for making clothes for an infant under the help and guidance of the forewoman of the sewing department. For this work the women had furniture especially adapted for them, and were encouraged to lie down in the rest room during the greater part of their dinner hour or at any other time that it was possible. In addition to the precautions for rest, these patients were given milk about midway in the forenoon and afternoon. They were under the observation of the medical officer, who looked after them daily and ordered rest for anyone who seemed to need it.

As regards confinement, the woman made their own arrangements for medical attendance. They were allowed to remain at work until labor actually began if they chose so to do.

Since this plan has been tried it has been found that the early notification of pregnancy is a new thing and that it finally had much to do with doing away with the fear which a woman had that she would lose her opportunity to work if the condition of pregnancy were suspected.

It is too early to estimate accurately the success of women working in factories, but the general result of the effort to improve the condition of these patients is very satisfactory.

Influence of Pregnancy on the Development of Cancer. Bainbridge³⁴ reports 2 cases, 1 of carcinoma originating in the breast and the other of sarcoma of the tissues around the orbit. In each the malignant growth was greatly hastened by the occurrence of pregnancy. The writer reviews the literature of the subject and concluded that pregnancy increased the rapidity of the growth of coëxistent spontaneous cancer. In some cases it seems as if the malignant growth were retarded during pregnancy, but significance should not be attached to this because, after delivery, the growth increases with great rapidity. The stimulating effect of pregnancy is exerted more markedly upon the reproductive organs if they have already been attacked by cancer, but cancer in any other part of the body is influenced in like manner. If the cancer can be removed, the pregnancy should be terminated without regard to the interests of the child. Even in advanced disease, when the mother cannot be cured, pregnancy should be terminated to mitigate her suffering and prolong her life.

Carcinoma of the Pregnant Uterus Operated Upon in Two Stages by Spinal Anesthesia. Mason-Conrad³⁵ reports the case of a woman, aged twenty-six years, married seven years, who had one spontaneous labor with normal convalescence. She was seven months advanced in her second pregnancy and suffered from irregular hemorrhage, with pain along the inner surface of the left thigh. On examination she was found to be badly nourished; hemoglobin, 55 per cent. The fundus was midway between the umbilicus and ensiform cartilage. On internal examination the cervix was deeply congested and hypertrophied. The tissues were indurated, irregular and congested, but no infiltration could be found in the vaginal roof. Owing to her extreme anemia and weakness it was thought unwise to operate. The vagina was firmly packed to stop actual bleeding and an attempt made to improve her general condition by keeping her in bed in the open air, by forced feeding and the administration of tonics. Under this treatment the hemoglobin rose to 70 per cent., bleeding, however, could not be controlled except by continuous packing, and septicemia was feared. Sixteen days after entrance to the hospital, abdominal Cesarean section was performed under paravertebral anesthesia. In order to meet the risk of hemorrhage a man willing to give his blood for transfusion was in readiness. Anesthesia was secured by 440 c.c. of 0.5 per cent. novocaine, the equivalent to 2.2 grams of novocaine and adrenalin 1 to 1000. The Cesarean operation required sixteen minutes; during the operation the abdominal wall remained completely relaxed and the patient was quiet. The child weighed 7½ pounds, but died six hours after birth. After delivery the cervix was cauterized with Paquelin cautery. There was the usual rise in pulse-rate during the operation, but this subsided afterward. The patient did well until the sixth day, when she had fever

³⁴ American Journal of Obstetrics, January, 1918.

³⁵ Surgery, Gynecology and Obstetrics, July, 1918.

and profuse vaginal discharge, the temperature continued to rise in the afternoon for several weeks. The patient finally made a good recovery.

Twenty-two days after the first operation the uterus was extirpated. The patient did well during the operation, but made a rather slow recovery, with rapid pulse. On the twenty-ninth day the patient was discharged at her own request. Death occurred from metastasis between four and five months after the first operation.

While anesthesia by spinal injection is not often used, in the present case its employment was remarkably successful.

Cancer of the Cervix Complicating Triple Pregnancy. Watson³⁶ has collected statistics showing the frequency of cancer of the cervix in pregnancy. In his own observation there have been 101 cases of cancer in 3555 obstetric patients. These figures coincide closely with other observers. His patient was in her sixth pregnancy, the previous having been without complication. On examination, cancer of the cervix complicating pregnancy was found. It was hoped to remove the uterus unopened, but at operation its size rendered this difficult; the uterus was accordingly opened at the middle line and it was found that triplets were present. The Wertheim operation for total removal of the uterus was then performed. The patient made an uninterrupted recovery.

Retroversion of the Pregnant Uterus Ending Fatally. Holden³⁷ reports the case of a woman in her sixth pregnancy who came to the hospital complaining of pain in the left lower abdomen, and frequency and burning upon urination, with incontinence. She was suddenly attacked by severe pain, with a desire to empty the bladder, but could not accomplish this. Medicine was ordered by her physician, which did no good, and the patient passed a sleepless night because of pain and the desire to urinate. On examination, a cystic tumor filled the pelvis, while the cervix could not be reached, as it had been carried so high up from behind.

A diagnosis was made of ovarian cyst complicating pregnancy, with cystitis. At operation a tumor was delivered from the pelvis into the entire lower abdomen, where it filled the true pelvis. The tumor was delivered from the pelvis and was found to be symmetrical; it did not resemble a pregnant womb and the tumor was more cystic than the normal pregnant uterus. In order to make the diagnosis sure the uterus was opened and found to be pregnant. It was emptied and closed and returned to the abdomen. The patient did badly after the operation, becoming toxic, and died in coma.

Autopsy showed the contents greatly degenerated. The case had been one of incarceration of the pregnant uterus.

Epilepsy in Pregnancy. Tomasilli³⁸ calls attention to the similarity of the paroxysm in epilepsy and eclampsia. He describes the case of a patient, aged twenty-five years, five months pregnant, who came to the hospital with a diagnosis of eclampsia and the statement that she

³⁶ American Journal of Obstetrics, September, 1918.

³⁷ Ibid., June, 1918.

³⁸ Annale de Obstetricia e Ginecologia, 1917, No. 41, p. 135.

had previously had convulsions. During the first day in the hospital she had eleven convulsions. A close analysis of the history and the negative findings in the urine suggested epilepsy. A vigorous treatment by bromides caused the convulsions to disappear.

The reviewer on one occasion saw a multiparous patient, aged about thirty years, in the first beginning of labor, who was having convulsions apparently eclamptic. A careful examination of the urine and physical examination of the patient made the diagnosis of eclampsia unlikely. There was no history of epilepsy. On leaving the patient entirely alone, it was found convulsions were absent. A thorough study of the case showed that it was entirely hysterical. The patient had characteristic serum albuminuria of pregnancy, but no evidence of genuine toxemia.

Albuminuria and Nosebleed in Pregnancy. Solomons³⁹ describes the case of a healthy primipara, aged twenty-five years; when seen she was bleeding profusely from the nose, although the urine and blood-pressure were normal. In spite of treatment with coagulose, anterior packing and adrenalin, the patient bled profusely for five days. Forty-nine hours after posterior packing of the nose the patient was delivered by forceps of a recently macerated child, weighing less than six pounds. After being in the nose two and a half days the plug was removed. The patient had slight fever during the first week, but ultimately made a good recovery.

The interesting question arises whether this patient will be liable to have nosebleed in subsequent pregnancies, and there is no way of absolutely determining the danger or absence of danger of such an occurrence.

The writer also reports a case of albuminuria of pregnancy in which the patient was put upon liquid diet, and labor was induced by bougie, both mother and child made a good recovery.

The State and Prenatal Hygiene. McConnell⁴⁰ calls attention to the importance of the period in the life of the child when it is wholly dependent for its continued well-being on the health and vigor of the mother. As former health officer of Glasgow, he has been able to study the death-rate of children at various ages. He finds that two-thirds of the deaths under three months occur during the first month of life. In the first week of the child's existence the deaths in both sexes are four times more numerous than in the second week and six times more numerous than in the fourth week after birth. On an average, Glasgow had an infant death-rate of 1.28 per 1000. He believes that infant death-rate on the whole has been decreasing during the past four or five years. In the second half of the first year the reduction is going on much more rapidly than during the first three months. Four per cent. of the children born are stillborn, and this would give the city of Glasgow approximately 1200 stillborn children each year. For Scotland this would give nearly 4000 each year. We may get an idea of the frequency of deaths resulting from prenatal conditions by observing that

³⁹ Medical Press, 1918, No. 105, p. 123.

⁴⁰ British Medical Journal, October, 5, 1918.

stillbirths and deaths from immaturity represent very imperfectly the total volume of life lost during the antenatal period, it is very difficult to estimate the loss of life due to abortion. The occupation of the mother, the effect on mother and child, the rapidly following pregnancies, the influence of alcohol, syphilis and drugs are all important and demand careful study. In addition, one must consider the frequency and importance of puerperal sepsis, toxemia and eclampsia, abortion and other forms of illness during pregnancy, frequently ending in the death of the mother. Maternity hospitals with wards for prenatal care and prenatal dispensaries are of great importance. Medical advisors and nurses and welfare visitors and welfare centers are all necessary and they must be numerous enough to supply an industrial population. They should be in connection with dispensaries with sufficient number of hospital beds in various hospitals to care for patients. The State can aid greatly by appointing a commission which should take up the whole question of antenatal pathology to obtain data to guide in the general work.

Sex Ratio and Sex Determination. Ewert⁴¹ has criticized the researches of Siegel upon the determination of sex and sex ratio. In accordance with Siegel's conclusions, conception is most apt to occur during the first week after menstruation, and this should make the proportion of males to females in children born in a civil population six to one. It is found that ratio at birth may be considerably modified by the prenatal differential death-rate. The statistics of large cities show that more male embryo than female are lost in the early months of pregnancy, which reduces the sex ratio at conception to approximately about three males to two females. It is possible that female embryo may graft itself to the lining membrane of the uterus more easily than the male. The gestation period for males is slightly longer than that for females.

The Relation of Syphilis to Abortion. Adair⁴² has analyzed the statistics from 1095 cases in whom there were histories of 2773 pregnancies, of which 2422 ended at term. There were 109 cases who had 197 abortions in a total of 621 pregnancies, making approximately 1 abortion to 3 pregnancies. In those who had no syphilis and negative Wassermann reactions there were 83 cases, with 142 abortions in 464 pregnancies, about 1 to 3. Of 13 syphilitic cases there were 23 abortions in 74 pregnancies, or about 1 to 3. Apparently, syphilis is not a very potent factor in ending pregnancy during the early months. There were 40 cases who had 62 abortions in a total of 202 pregnancies, a ratio of about 1 to 3. In 30 patients who had no evidence of syphilis there were 49 miscarriages in 161 pregnancies, or nearly 1 to 3. In 7 cases with indications of syphilis there were 10 miscarriages in 27 pregnancies, a little more than 1 to 3. These facts would indicate that syphilis is not responsible for a high percentage of miscarriages. So far as premature birth is concerned, one-third of the mothers giving premature birth to children show evidence of syphilis. About 20 per cent. of premature infants give positive evidence of syphilitic infection. Of the mothers

⁴¹ British Medical Journal, September 28, 1918.

⁴² American Journal of Obstetrics, November, 1918.

who had stillbirths, 10 per cent. had positive Wassermann reactions, while of the stillbirths in hospitals 12 per cent. were proved to be syphilitic. Syphilitic mothers gave birth to two malformed infants, which is a higher proportion than that of women who had no syphilis. In 2 out of 5 cases of hemorrhage in the newborn, syphilis was present as an important factor.

Acidosis in Pregnancy. Emge⁴³ reviews Van Slyke's work in the diagnosis and treatment of toxemia of early pregnancy, and employed the technic set forth in the account of his cases. There were 21 of these cases, divided into four groups: (1) Eclampsia and preëclampsic toxemia; (2) nephritis of pregnancy; (3) excessive vomiting of pregnancy; (4) menstruation of normal women. These studies are based upon studies to determine the carbon dioxide toxins of the women's blood just before eclampsia.

It was found that menstruation does not alter the alkaline balance of the blood in normal women, as shown by carbon dioxide coefficient. Labor increases the acidity of the blood by reason of the muscular exertion. That the acidity of the blood in eclampsia increased in accordance with the number and severity of convulsions, points again to the influence of muscular exertion. The acidoses of the toxemia of pregnancy is usually only equal to that noted in normal pregnancy. Anesthesia and starving both depress the carbon dioxide proportion in the blood. The blood collected in open tubes will give lower carbon dioxide than that collected under oil.

Premature Separation of the Normally Implanted Placenta. Moorse⁴⁴ reports 2 cases of premature separation of the normally implanted placenta. The first was that of a woman in her ninth pregnancy, whose previous history was unimportant. There was no history of previous illness or accident, and the patient was about eight months advanced. Upon getting up in the morning she was seized with cramp-like pain, which shortly became more severe and constant. She was immediately taken to the hospital. The fetal heart sounds could not be heard, nor could the position of the child be determined. The external os was closed, and there was neither vaginal discharge nor bleeding. Upon admission to the hospital she was pallid, restless and complained of intense abdominal pain. A diagnosis of separation of the normally implanted placenta was made and the patient subjected to Cesarean section. The uterus was firm and bluish-black in color and blood had extravasated beneath the peritoneal covering of the uterus. Upon opening the peritoneal cavity a small quantity of serous fluid escaped. The tubes and ovaries were free from hemorrhage. Upon opening the uterus a quantity of fluid and clotted blood escaped. The child was dead and the placenta completely detached. The patient made an uninterrupted recovery.

Microscopic examination of the body of the uterus removed showed hemorrhages into the decidua at the placental site. The bloodvessels were normal.

⁴³ American Journal of Obstetrics, May, 1918.

⁴⁴ Surgery, Gynecology and Obstetrics, February, 1918.

The second case was in her thirteenth pregnancy, aged forty years, She was brought to the hospital because she had profuse uterine hemorrhage. Upon admission, the blood-pressure was 160. The urine showed casts and a heavy trace of albumin. The abdomen was very sensitive. The uterus was about eight months pregnant, with the characteristic signs. Fetal heart sounds were not heard. The visible hemorrhage ceased shortly after admission, but the uterus continued to become more tense. The abdomen was opened, the uterus incised and the fetus found dead and the placenta partly separated. Supravaginal hysterectomy was performed. On the second day after the operation the patient died of bronchopneumonia. Autopsy showed also parenchymatous nephritis. Microscopic section from the uterus showed hemorrhage most intense in the outward half of the wall.

Torsion of the Great Omentum during Pregnancy. Bubis⁴⁵ reports the case of a woman, married two and a half years, who had never had bowel trouble previous to her last pregnancy. Six months after marriage she aborted at four months, following a fall, but made a good recovery. Menstruation became normal, and fifteen months later conception again occurred. Upon examination the uterus was enlarged to the size of a four months' pregnancy and pushed to the right side by a distended bladder. The patient complained of slight constipation. One month later, when five months pregnant, she had slight abdominal distention, constipation and some fulness in the right lower abdomen. Soon afterward she developed an increasing tenderness just above the uterus half-way between the umbilicus and the right cornua of the uterus. She was put to bed and an enema was given. No relief was obtained, although the temperature, pulse and respiration were normal. Pain at the tender point increased, with gradual rise of pulse and temperature; the abdomen became distended, and along the anterior upper right surface of the uterus, extending almost in a straight line, four small nodules could be palpated. There was slight abdominal rigidity, but not in proportion to severe pain caused by pressure on the tender spot described; no definite mass could be made out, nor was there evidence of fluid in the abdomen. Upon opening the abdomen a considerable amount of unclotted, bloody fluid escaped. A thickened, discolored mass, slightly adherent to the posterior wall of the uterus and extending down to the cul-de-sac, was loosened and delivered through the incision. This was the large omentum, swollen, edematous and twisted on its long axis and gangrenous at the lower portion; the veins were swollen and enlarged, and some contained clots. The omentum was removed close to the transverse colon after tying it off with interrupted plain catgut, a small, slightly adherent appendix, with the tip pointing upward, was then removed, and upon section showed an obliterating appendicitis. The patient made an uninterrupted recovery from the operation.

Eight months later she came into labor and was successfully delivered by forceps; shortly afterward the patient complained of abdominal

⁴⁵ Surgery, Gynecology and Obstetrics, January, 1919.

distention, pain and inability to empty the bladder. The uterus was enlarged, relaxed and extended up into the right side of the abdomen. Vigorous uterine massage caused the expulsion of two very large blood clots and 500 c.c. of urine. A firm bandage was applied and ergot given, and no further trouble was encountered.

Various conditions have been given which might give rise to torsion of the omentum, such as tuberculous peritonitis, hernia, malignancy, appendicitis, pelvic infection, adhesions, hemorrhage within the abdomen, accessory omentum which becomes strangled and sudden severe strain with increased peristalsis or forcible attempt to reduce a hernia. The amount of congestion varies and may be accompanied with gangrene and infection, which is generally from a hematogenous source.

In 12 cases reported, torsion of the omentum occurred 7 times in the male and 5 in the female, the average age being thirty-six years. In 5 cases the entire omentum was involved, 10 were acute, 1 chronic and no mention was made of the other.

Pain in the right iliac region is a constant symptom; the pain may be referred to the epigastrium, to the posterior right kidney region, the right hip, or the patient may complain of slight uneasiness and bound down sensation in the region of the appendix; there may be constant, localized, dull, aching pain in the abdomen. Neither rest in bed, bowel movements or food have any effect on the severity of the pain. Some patients have diarrhea, some constipation, a considerable number have no disturbance of the bowels, and in 5 gas was freely passed from the rectum. Nausea and vomiting were present in about one-third of the cases. At times the vomiting suggested obstruction of the bowels. Should complications arise, the temperature and pulse may be little, or not at all, affected. The highest temperature recorded was 102° F.; the highest pulse-rate, 120. Blood-pressure and examination of the blood were without special significance. In one case the white cells were 12,000, with 81 per cent. polymorphonuclear. Headache and backache were occasionally seen, with prostration and flushed face.

In all but 3 of the cases there was a distinct tumor which could be made out, the margins were indefinite but the tumor extended from one and a half inches below the costal margin to the crest of the right ilium from the right kidney to the appendix region. A large swelling may be found above the pubis, attached to the uterus, palpable through the vagina. In 1 case no mass or hernia could be felt, but the whole right side of the abdomen, extending to the median line, was dull and flat on percussion. Abdominal distention was present in 13 per cent. of the cases.

It is stated that purely abdominal torsion of the great omentum cannot be diagnosticated; there are no definite symptoms until sufficient torsion has occurred to interfere with the return circulation. The absence of hernia, with the presence of a painful spot which gradually increases in severity on the right side of the abdomen, and the mildness of the symptoms in comparison to appendicitis or other severe intra-abdominal condition, may point to the condition present. The early

or sudden appearance of an abdominal tumor with definite margin, dull on percussion and sensitive, or a large resisting area, would render the diagnosis of torsion of the omentum comparatively safe.

The prognosis depends on early and efficient operation, the mortality and risk increasing with delay in diagnosis and treatment.

Operation is the only treatment and an exploratory operation is justifiable when the diagnosis is not clear. The incision is made over the most prominent part of the tumor if one can be felt, or over the spot of tenderness in the abdomen. Upon opening the peritoneum, free fluid escapes. It may vary from a serous, straw-colored fluid to dark blue, suggestive of an extra-uterine hemorrhage. The mass is easily palpated, readily separated from the surrounding tissues and gives a peculiar crepitus similar to that obtained in breaking up light adhesions. The color varies from dark red to blue-black, and numerous pulsating arteries may be present in the tumor, which is usually twisted from right to left eight or nine times. In neglected cases gangrene may be present. In operating it is best to remove the omentum close to the transverse colon to prevent the extension of thrombi or the formation of abscess of the omentum. The appendix should be removed and the abdomen closed without drainage.

Torsion of the omentum during pregnancy may result in infection, adhesions, thrombi and emboli, and, in some neglected cases, pregnancy is interrupted.

The Positive Wassermann Reaction which Changes to Negative at Termination of Pregnancy. Menton⁴⁶ draws attention to the fact that Wassermann reaction does not give a specific diagnosis for syphilis. It is a fallacy to accept a negative test as indicative of freedom from syphilitic infection. It has been proved that negative Wassermann is not incompatible with the presence of spirochetes in the individual. A patient having active lesions in the spinal cord may give positive Wassermann in the spinal fluid while the blood will react negatively. A positive reaction in the blood of the mother does not necessarily indicate a positive one in the fetus or baby at birth. There is evidence that syphilitic infection may become latent or reduced in intensity and only become active again because of some change in the metabolism of the individual. The writer reports that observations made in the pathological laboratory of the Elizabeth Steel Magee Hospital showed the change from positive reaction in pregnancy to a negative one at the termination of pregnancy. It was the practice at the hospital to perform a Wassermann test on the blood of all ward patients, and until recently blood specimens from both mother and baby have been examined. The blood was obtained from the arm of the mother by venepuncture at the time of delivery, and immediately after the birth of the baby by expression from the placental end of the umbilical cord, and the two sera examined simultaneously. It was observed that occasionally serum from the same woman would change its reaction in a very short time following delivery. The blood rapidly lost its property of giving a

positive Wassermann, and the only factor which might account for this was parturition. In studying this subject, 357 cases were examined, in which 48, or 13.45 per cent., gave a positive reaction. Of these 48 positive cases, 16 of the corresponding cord bloods gave positive reactions. In two babies whose mother's blood was negative the sera of the cord blood was positive. In 26 of these cases giving positive reactions, blood was withdrawn for subsequent examinations at periods varying from twenty-four hours to two weeks after labor and again examined. No postpartum blood obtained later than two weeks after delivery was tested. In 12 there was no appreciable change in the quality of the positive reaction, while the remaining 14 gave negative reactions. In the blood which reacted negatively following delivery a marked diminution occurred in the reaction at the end of twenty-four hours, and tubes containing a half-unit of acetone in soluble antigen was invariably negative at the end of forty-eight hours, a positive reaction persisted only in a tube containing a cholesterin antigen and in the smallest degree. Later than this a negative reaction was obtained by both antigens. Errors or variations in technic were excluded by tests. When the patient left the hospital two weeks after delivery the blood was negative. In only one of the cases was a definite history of previous syphilitic infection obtained; in two others the blood from the umbilical cord also gave positive reactions; two of these women gave birth to macerated, premature fetuses, and this they had previously done at early periods at former pregnancy. The lesions of syphilis were found at autopsy in these infants; no examination for spirochetes was made. Three of the women had symptoms of syphilis, while the remainder gave no history of syphilitic infection at any time and were apparently normal. A careful study of the cases revealed no factor, other than parturition, which had any influence on the phenomenon. Neither anesthesia employed nor lactation seemed to have any influence. The factors, he states, may have been responsible in the result obtained by other observers. This phenomenon cannot be well explained, but evidently parturition may markedly alter certain properties of the blood serum. Probably the substance giving rise to a positive Wassermann is confined to maternal circulation. Changes in the chemical composition of the blood have been demonstrated by Folin, and this may be at the bottom of the phenomenon noted. The fact that only about 50 per cent. of the syphilitic women showed this alteration in the blood would indicate that the phenomenon is not due to any chemical change in the chemistry of the blood. Some have thought that inactive spirochetes are present in the individual and that changes in the blood of pregnant women stimulate these latent organisms into activity. Immunity developing in various tissues of the body might not extend to the placenta. The Wassermann reaction was tested in two spinal fluids, hoping to detect the original source of the latent infection in the cord, but the result was negative. The microscopic study of the placentas in the 26 positive cases showed extensive pathological changes. The villi showed various degrees of endocarditis and endophlebitis, with marked increase of the stroma cells; proliferation of the collective tissue was so intense in some areas that the lumina of the vessels were obliterated.

From these and other researches it is evident that no woman who has given birth to a macerated fetus should be considered non-syphilitic because of a negative Wassermann test of the postpartum blood. The selection of a woman with a similar Wassermann finding as a wet-nurse is without risk. It is plainly evident that the blood of a pregnant woman giving antepartum positive Wassermann frequently shows negative reaction when the postpartum blood is examined.

Red Degeneration of Fibroids during and Following Pregnancy. Schiller⁴⁷ describes a case of a woman having an intramural fibroid close to the serosa. On the cut surface of the tumor, which was the size of an orange, there could easily be seen a shell of tumor tissue one-third inch thick, of gray-yellowish color, like a caseous mass, only a portion of normal tissue reaching the capsule. A microscopic examination of the tissue from the center of the tumor showed normal fibroid structure. Where tissue had been taken out, periphery necrosis was present. The uterine muscle close to the fibroid showed necrobiotic infection as the probable etiological factor. This is an instance of what is known as the red degeneration of fibroids. In these cases the cut surfaces of the fibroid are mahogany color or that of raw meat, and the color darkens when exposed to the air. There may be various areas in the tumor differing in color, there may be red or brown areas distributed over the tumor. The distribution of the necrotic process is highly interesting, sometimes it appears in streaks among the bundles of fiber and the entire tumor may be divided into distinct portions. The cut surface is dry, and yet fluid can be pressed from the tumor. The color is due to the escape of blood from necrosed tissue and diffusion of blood pigment into the cells.

Red necrosis, so-called, is an aseptic necrobiotic process with hemolysis of tissue. This would suggest hemolytic bacteria. A positive conclusion concerning the part played by bacteria cannot at present be made. The lipoids of degenerated fibers are markedly hemolytic, but this action is inhibited by normal blood plasm. Another consequence of disintegration of blood corpuscles from hemolysis is deposits of fiber in the small vessels and thrombosis. If the process is extensive and rapid, pain and enlargement and softening of the tumor will be the final result. The fact that some of these cases begin rapidly and without warning, points to sudden stoppage of the arterial blood stream in the tumor. This may be caused by the contraction of the uterine muscle.

The microscopic picture of the process does not differ from that of true necrosis of any other organ. The nuclei of the cells are purely stained or in some instances take no stain at all. Evidence of granular and hyaline degeneration are present, the muscle cells seeming to resist the necrosis longer. Hemorrhages into the tissue are also seen.

The symptoms of this process may be very acute, resembling a ruptured tubal pregnancy or a twisted cyst, or symptoms may be those of chronic malaise or toxemia. In the acute cases peritoneal irritation is also present. Sudden enlargement and tenderness in the tumor during and after pregnancy are significant. In most acute cases there is fever.

⁴⁷ American Journal of Obstetrics, October, 1918.

When the tumor begins to break down, a chronic toxemia develops. In non-pregnant women, acute symptoms are often absent.

The prognosis depends upon the symptoms, uncomplicated cases usually recover. In 67 cases there were 3 deaths, 2 following operation. In the cases with acute symptoms in which no operation was done the symptoms gradually subsided, and were followed by those of more sub-acute or chronic intra-abdominal inflammation, with more or less toxemia. The possibility of the appearance of secondary infection in the later stages of rupture is always present. Sometimes after months no further change could be observed in the tumor.

So far as treatment is concerned, in the mild cases rest in bed and attention to the general health is all that is needed; in the acute cases where something must be done as soon as possible, where there is rapid enlargement, fever and toxemia, abdominal section is indicated, whether myomectomy or hysterectomy must be determined by the operator and the condition present; very often a surgeon cannot outline what he will do until the abdomen is opened and he can inspect the tumor.

The writer describes the case of a woman, aged twenty-five years, pregnant five months, who had been during pregnancy in perfect health. She suddenly had severe abdominal pain, for which she took a cathartic and used hot applications; a few hours afterward the abdomen was distended and the uterus was nearly to the umbilicus; just above the left Poupart's ligament there was an oblong tumor the size of a lemon, extremely tender, the long axis being about in the direction of the inguinal canal. The tenderness was so intense that thorough examination could not be made. There had been no passage of gas nor fecal material for sixteen hours. The leukocytes were 11,000. Incision was made over the tumor, which proved to be an intramuscular fibroid, the capsule was severed, the mass easily enucleated and the pit closed over with catgut. There were a number of smaller fibroids on the posterior surface of the uterus. The peritoneum and muscles were closed in the usual manner. Pain and fever disappeared on the first day and the patient went to term and gave birth to a child weighing seven pounds.

The Treatment of Fibroid Tumors by Radium. As these tumors frequently complicate pregnancy the report of Kelly⁴⁸ is of interest to obstetricians. Kelly concluded that surgeons should not be less self-sacrificing than physicians who struggle to put an end to the era of drugs, toxins and vaccines by sanitation and hygiene. While it is the duty of obstetric surgeons to build up surgical technic, making operations safer and carrying surgery to success in any field, still surgeons would be willing to limit their work or even to discontinue it for the sake of the result obtained for the patient. The operation of hysterectomy and myomectomy was built up with infinite pain by obstetricians and surgeons, and has been most successful. So long as it can be shown that operation in a given series of cases will not only give better health but save life, the question of necessary mutilation need not occasion regret. This attitude of mind, however, is no longer tenable. In the use of

⁴⁸ Surgery, Gynecology and Obstetrics, October, 1918.

radium we have a simpler and safer procedure, which is so successful that death occurring in the fibroid group becomes an indictment. If, however, radium should fail, operation has merely been postponed without detriment, hence the logic of the facts would indicate that radium demands the first place in the choice of methods in a given case.

Hydatiform Degeneration, from Observations of One Hundred and Fifty Cases. Meyer,⁴⁹ examining the records of the department of embryology in the Carnegie Institute at Washington, states that this material is not truly representative of the entire period of gestation unless we can assume that this degeneration is constant during the whole period.

The great majority of cases are specimens of total or partial degeneration from the later months of pregnancy. Estimations based on the cases that do survive can give little idea of the actual frequency of the condition.

The Mall collection in Washington shows the frequency of the disease eight times as great since the first 2400 accessions. One in every 261 cases seems to be the average frequency. There is also confusion because at various times specimens of different size have been studied and recorded as being genuine. The writer then describes and illustrates several specimens, and calls attention to the confusion which has occurred because specimens are classified in accordance with the number of vesicles in a given specimen. He believes that this condition is far more frequent than that stated by other writers upon the subject; most of these were from the early months of gestation, although there are instances on record in which a blighted ovum was expelled a month after full term. The average period from the last menstruation was two and one-quarter months. The average age of 36 women having this condition was thirty-one years. This condition usually arises after one and sometimes two normal pregnancies.

The Heart of the Pregnant Woman. Burchardt⁵⁰ contributes a paper upon the condition of the heart in pregnancy. He draws attention to the importance of discovering, if possible, foci of infection whose products may seriously depress the action of the heart. Thus a chronic infected condition of the appendix, pockets about the teeth, chronic intestinal toxemia or any focus of such infection might prove important. Symptoms which apparently indicate serious conditions of the heart may entirely disappear after the attack of toxemia has subsided. One cannot then justly appreciate the condition of the heart in pregnancy until he is certain that such foci are not present. Again, in all cases in which the heart has been to any degree damaged, the question of compensation is of the greatest importance, if this is established, the condition of the heart is, practically speaking, for the given case, normal. Relatively low pressure with speedy increase in the amount of albumin, granular casts and blood cells, furnish a more serious complication when the heart pressure and corresponding symptoms connect with it. Sudden change in complexion from pink or red cheeks to a waxy, pale skin, are indicative of cardiac mischief. A careful study of the finger-nails will detect

⁴⁹ American Journal of Obstetrics, November, 1918.

⁵⁰ Ibid., December, 1918.

brittleness, unhealthy color and shape, and cross ridges which indicate malnutrition of a serious nature. So far as treatment goes, an early diagnosis is of the utmost importance. If possible, impregnation should be avoided, but when the patient has become pregnant, if the damaged heart shows signs of well-developed compensation, pregnancy need not be interrupted. The hygiene of pregnancy must be carefully maintained, and exercises by walking are of the greatest importance. Blood-pressure readings give assistance and furnish information which is of service in controlling the activities of these patients. Should there be offending tonsils or teeth they should be removed, even if the patient be pregnant. Headache and rheumatic pains frequently lead patients to use the coal-tar preparations, which are depressing to the heart, and for that reason should not be given. Nasopharyngeal or dental work should be thoroughly done and under no circumstances neglected. It is often best to use digitalis in considerable quantity for a long time.

Streptococcic Meningitis in the Mother and Child in Utero. Kramer and Wright report the case of a patient, aged twenty-four years, admitted to the hospital complaining of backache for several months. The patient had been treated but had no definite knowledge as to what had been given her. About ten days before admission the patient had cold, backache, pains in the chest and sore throat. She became delirious, and physical examination showed that she was eight months pregnant. On deep pressure one could palpate the cervical and inguinal glands. The pupils were dilated and reacted badly to light; breath-sounds were harsh and rales were present over both lungs. The temperature was 105°; leukocytes, 17,000; pulse, 140. The patient died on the day of admission to the hospital.

At autopsy the heart muscle was soft and pale red, edema and congestion of the lungs were present; the intestines and stomach were congested; the kidneys contained very small hemorrhagic areas and the parenchyma was clouded and swollen. The uterus was bluish red, soft and large, and contained a well-developed fetus. The cervix was congested, containing mucus; the fetal membrane was intact and the placenta seemed to be normal. The brain was congested, swollen and the entire cerebral hemispheres, extending from the Sylvian fissure to the occipital region, were covered with pus. The accumulation was more marked on the right side. From this pus, streptococci were obtained.

The fetus was well formed, well nourished and 40 cm. long. There was nothing abnormal in the thorax and abdomen. The brain seemed normal but the meninges were congested and slightly swollen. The base of the brain, including the cerebellum, was covered with slight, greenish-yellow pus. The ventricles were not changed. From this pus were obtained streptococci.

Funnel Pelvis. Williamson⁵¹ states that funnel pelvis is one which has a normal inlet, but outlet measurements smaller than normal. It occurs in about 6 or 7 per cent. of all patients. A minute examination of these cases shows at the outlet of the pelvis two triangles, the study of which is of interest in determining the comparative pelvic size.

⁵¹ American Journal of Obstetrics, October, 1918.

In examining patients, a Boudin pelvimeter is used, together with palpation. Of 106 cases delivered, 95 had typical funnel type pelves, 10 generally contracted and 1 flat funnel pelvis. In 2 cases pubiotomy was performed; both mothers recovered, but one child died after delivery. In the whole series 65 delivered themselves without much assistance. Operation was necessary in 41 cases. Cesarean section done four times, pubiotomy twice, high forceps but once and medium ten times. From this series of cases the writer concludes that abdominal Cesarean section should be performed at or just before term, where the outlet contraction is extreme. In moderately contracted pelvis, premature labor may be induced successfully. Pubiotomy is advisable in some cases in which forceps have failed. Spontaneous labor is still possible in a pelvis having transverse diameter of 7.5 cm., with anteroposterior diameter at the outlet of 7.5 cm. The funnel-shaped pelvis is the usual cause of deep peritoneal tears.

LABOR.

Painless Childbirth. Wakefield⁵² states that he has had 400 confinements in his own personal work, using scopolamine, and that his percentage of stillbirths corresponds closely with that of Kroenig, namely, 1.7 per cent. Following up the children for intervals ranging from one month to four years, 4 deaths in the 400 cases have occurred, 2 of which were the result of accident. He ascribes this remarkable vitality in the children to the fact that the mother has not been depressed by pain during labor.

He believes that the objection to morphine-scopolamine treatment arises largely from the fact that large doses of morphine were formerly given; at present this is not the case, and in his experience the results are much better.

Forceps Rotation of the Head in Persistent Occipito-posterior Position. Bill⁵³ believes that when the occiput is rotated posteriorly, anterior rotation should in all cases be secured before delivery. This he effects by the use of forceps, and his experience included 249 cases, of which 149 were primipara, 77 cases were in their second labor, 17 cases in the third, and 6 in the fourth. In 170 cases the vertex was on the right side and behind, and in 79 cases on the left side and behind. In 104 the head was at the brim, its greatest diameter not having passed through; in 88 cases the head was in the pelvic cavity above the spine of the ischia and had not entirely passed through the os uteri; in 43 cases the head was in the pelvic cavity and had entirely passed through the cervix, and in 14 cases the head was at the pelvic outlet. In 11 of the last 14 cases the occiput had rotated into the hollow of the sacrum; in all of these the head was rotated with forceps until the occiput came directly under the symphysis.

The rotation was always through the small arc of the circle, namely, from right occipito-posterior to right occipito-anterior, and no difficulties were encountered in the rotation. To succeed in this the forceps must be

⁵² American Journal of Obstetrics, May, 1918.

⁵³ Ibid., December, 1918.

accurately applied to the sides of the child's head and no attempt should be made to apply them until the exact position of the head has been made out. If forceps are turned in such a manner that the blades lie continually in the same axis, any sort of good forceps may be used. A solid blade instrument is more easily applied, the blades take up less room in the pelvis, the smoothness of the blade helps the rotation, and the instrument is more easily removed after the rotation is complete. The instrument is carefully applied to the sides of the head in such a manner that the concavity of the pelvic curve of the forceps looks toward the fundus, that is, in cases of posterior position, toward the child's face. This gives, in reality, a reverse application so far as the child's head is concerned. The handles are depressed before they are locked in order to secure good flexion, then the handles are first raised in the direction of the child's face and then carried around in a large circle, first toward the patient's thigh and then posteriorly. The preliminary elevation of the handles for flexion and the large sweeping movement tend to keep the blades of the forceps in the same axis throughout the rotation, thus allowing the head to turn without difficulty. Up to this time no traction whatever is made, traction being used only when the head is in the normal anterior position. No force is required if this be properly done; failure or the necessity of employing force, occur only when the operator tries to rotate the head by twisting the handles instead of sweeping them in a large circle. The rotation should never be accompanied by traction. The head should be turned in that part of the pelvis in which it happens to lie, and in some cases in which the head seems to be too firmly fixed in the pelvis it may be pushed up a little, when it will be somewhat freer to rotate. This is a very important step, because the mistake is often made of first drawing the head down to the pelvic floor and then rotating it; this is not advisable, for considerable force is required in drawing the head down while the occiput is still posteriorly. The same objection applied to attempt to deliver the head in a posterior position without rotating it. The writer found it as easy to rotate the head in one part of the pelvis as in another.

Injuries to the mother have not been observed where rotation has been carried out in this manner, and such injuries are undoubtedly due to attempts at rotation and traction simultaneously. When the rotation is complete, the forceps are naturally upside down and must be removed and reapplied. Before one removes them it is justifiable to make very slight traction to fix the head in its new position and tend to prevent the return to the old position before the reapplication is made. In rare cases the head slips back before the reapplication is made and has again to be rotated. In making the reapplication it is important to apply the posterior blade first, as this tends to support the occiput and prevent its rotating backward during the application of the anterior blade. After the second application delivery is accomplished as in any normal case of anterior position.

~ Successful rotation makes the greatest possible difference in the ease of delivery; it is often seen that in multipara, in which there has been no progress, that the head descends to the perineum with very little

traction after the rotation, in marked contrast to the case in which, under similar circumstances, the physician pulls with all his strength upon the unrotated head. The writer prefers rotation with forceps to rotation with the hands. Manual rotation is far preferable to any attempt at traction upon an unrotated head. The time during labor at which the forceps are applied varies in different cases, but, as a rule, there is no interference in the first stage of labor and a reasonable time is allowed for spontaneous rotation.

The success of this maneuver depends on correct diagnosis of the position, the true cephalic application of the forceps, rotation without traction, the sweep of the handles of the forceps through a large circle, very slight traction to fix the head in its new position and the application of the posterior blade first and the second application of forceps.

Scopolamine-morphine Amnesia in Labor. Livingston⁵⁴ has used this method in 275 cases of delivery giving scopolamine-pantopon amnesia. While he had no accidents, the results in none of the cases were ideal. The necessary quiet and isolation can only be given in a hospital, and patients desiring this method should not expect to receive it in their homes. To carry out this method the physician must have an isolated delivery room in which the patient remains during the whole period of labor, and the enthusiastic coöperation and unremitting care of the nurses of the hospital. The nurse employed for the purpose must remain in the delivery room throughout the whole of almost every delivery.

The average duration of labor after pain had begun to be regular, was ten hours and ten minutes, the longest forty-six hours. The average time from the first injection to delivery, seven hours, the longest twenty-six hours. The writer believes that the average duration of labor has not been lengthened and that in primipara the first stage is certainly shortened. Under scopolamine the cervix softens and the tight cervical ring of ordinary labor is generally absent, uterine contractions were not violent, but the relaxed condition of the cervix gave a lessened resistance to expulsion. Vaginal examinations were infrequent, but, if no assistance was given, the second stage would probably be prolonged. There is less violent expulsive effort than in usual labor. The third stage was uninfluenced, there is no postpartum hemorrhage, but it was recognized that these patients demand unusual care. They should never be left alone during the process. The scopolamine used was the so-called staple preparation of La Roche, each ampoule contained 1.2 c.c. In the early cases narcopine was employed, and, when this could not be obtained, pantopon. Pituitrin was used in 22 per cent. in cases where the cervix was fully dilated and the head was low. There was no maternal mortality, and there was no infection of the genital tract or at the site of injection. There were no cases of insanity.

No evidence was seen regarding the truth of the statement that the method is very dangerous to the child. Its advantages are that its first results must be carried out in properly equipped hospitals. The

⁵⁴ American Journal of Obstetrics, October, 1918.

expense of this is very large. Each patient must be treated in accordance with her individual needs. The physician must remain present or be within call during the entire time of treatment. This is not suitable for cases in which delivery is expected within a few hours.

The advantages to the mother are the saving of shock, especially in patients with heart lesions and moderately contracted pelvis. The mother knows during her pregnancy that labor will be practically free from suffering, and this is a most comforting and stimulating influence. The cervix dilates with less trauma and more rapidly in first labors. It is rarely necessary to make high application of forceps. The pains are less common and less severe and engorgement of the breasts does not develop excessively. There is absence of postpartum shock, muscular soreness and exhaustion, and convalescence is more rapid.

The advantages for the child are lessened infant mortality and the better condition of the infant because of the better general state of the mother's health.

Abundant experience has shown that this method has a very limited value if strict isolation be practised; and if patients are under the constant care of skilled nurses and doctors a certain number of primiparous women may be greatly helped by taking scopolamine-morphine; its indiscriminate use, under other conditions than the above, has done harm and should never be allowed.

A committee appointed by the Royal Society of Medicine published a report of its investigation of this subject in the *Proceedings of the Royal Society*, section on obstetrics and gynecology, 1918-19; Potts, Rorke, Brydone and others comprised the committee. Observations were conducted in the wards of various hospitals where the method was employed. Queen Charlotte's Lying-in Hospital, General Lying-in Hospital, St. Bartholomew's Hospital and St. Thomas's Hospital were those selected. A standard solution of scopolamine was employed, and the initial dose was $\frac{1}{4}$ grain morphine and $\frac{1}{150}$ grain scopolamine; after this the doses of scopolamine were $\frac{1}{450}$ grain. Patients were isolated and precaution had been taken to avoid disturbances of any sort.

At Queen Charlotte's Hospital 67 cases were treated, with good results; in 90 per cent. labor pains were diminished, amnesia was obtained in 46.2 per cent., and partial amnesia in 44.7 per cent. Analgesia was complete in 32 cases and partial in 31. There were 2 failures. The memory test could not be relied on. There was no active delirium, and it did not seem that labor was prolonged. There were twelve forceps deliveries which could not be ascribed to the drugs used. Out of 67 cases the placenta was expelled spontaneously in 65, which was taken as evidence that the uterus contracted well. In 13 cases the baby was described as blue, but in only 1 was the condition serious. Three babies died, 2 of whom were premature, 1 had bronchopneumonia on the sixth day. There were 3 cases of asphyxia in forceps deliveries not due to the drugs.

In the General Lying-in Hospital 20 cases were treated without much appreciable effect upon the mother. In the second stage delay was

very marked; 1 child was restored by artificial respiration and died seven hours later; several required artificial respiration.

At St. Bartholomew's Hospital 20 cases were treated, and the second stage was distinctly prolonged, especially in primipara. Out of 14, 8 failed to deliver themselves and had to have artificial delivery. The third stage was also prolonged and there was some relaxation of the uterus after delivery. The children did not breathe well but were not seriously embarrassed. The puerperal period seemed normal. The duration of labor was long and increased in the instrumental delivery, and there was a tendency to relaxation of the uterus after delivery.

In St. Thomas's Hospital 80 cases were treated, 60 primipara and 20 multipara. The memory test was useless, but patients' reaction to the prick of a hypodermic needle was of value. Five per cent. of the cases were complete failures; there was delay in the second stage and increased number of forceps deliveries. Pituitary extract was given in 11 cases and helped delivery in 5, while in the remaining 6 the forceps had to be used. There was greater hemorrhage than usual in 9 cases, 4 being postpartum hemorrhage. There was delay in the child's respiration. The disadvantages were prolongation of labor, the tendency to delay in contraction in the third stage and the fact that the infants were slow in breathing.

In the 65 cases at the City of London Lying-in Hospital the patients were all primipara, in 34 per cent. uterine contractions were less vigorous than normal and patients did not help themselves as much as is usual. The second stage of labor was prolonged fifty minutes on the average. Forceps were applied in 32 per cent. of the cases while the normal rate of forceps deliveries in the hospital for primipara was 11.8 per cent. There is an increase in the cases in which the occiput rotated posteriorly; there was delay in the respiration of the child.

This report contains nothing which has not already been observed and confirms the belief that the use of scopolamine-morphine is distinctly inferior to other methods of preventing pain and expediting labor.

PAINLESS CHILDBIRTH AND THE SAFE CONDUCT OF LABOR. Schwartz⁵⁵ selected a series of 1000 cases from which to form conclusions concerning certain branches of practice. He seldom delivers with high forceps or forceps in midpelvis. The forceps is used in primiparae when the head is on the perineum and completely rotated, and also in multiparae under the same condition. In primiparae by the time the head is appearing in the vulva the patients should usually reach their greatest degree of elasticity and the application of forceps protects the perineum, especially if accompanied by single or double episiotomy. This is the simplest method of using the forceps, and consists especially of lifting the head over the perineum; it is the only application of forceps which is encouraged in the practice of the writer. This practice accounts for the many episiotomies and low forceps deliveries. Women who have had miscarriages are classed in the hospital records as multiparae.

In the 1000 cases, chloroform, ether, nitrous oxide and scopolamine were employed; morphine and narcophen were used in a few cases and chloral hydrate was reserved for eclamptic cases. Chloroform, ether, nitrous oxide and scopolamine should be employed only when the obstetrician is in constant attendance at the bedside, as each of these four agents has a special value. Nitrous oxide and scopolamine are comparatively harmless for mother and child; chloroform and ether are not so harmless for the mother and distinctly dangerous for the child. The same statement applies to morphine. The judicious use of pituitrin before delivery and ergot after delivery make it possible to regulate uterine contractions after delivery and prevent postpartum relaxation of the uterus. In the 1000 cases, 12 primiparæ and 91 multiparæ, that is 10 per cent., received no anesthetic; they did not feel sufficient pain to justify their use. With these mothers, 7 children were stillborn and 1 died soon after delivery, a fetal mortality of 8 per cent. Chloroform was given exclusively in 377 cases, about one-third of all. The writer considers it the best anesthetic for obstetric use; 11 babies were stillborn under chloroform and 9 were so deeply asphyxiated as to require artificial respiration. Ether exclusively was given to 64 cases, or about 5 per cent. of all cases; they were mostly toxemia and eclampsia. Ether with nitrous oxide or scopolamine was used not as often as one-fifth that of chloroform. Ether is comparatively safe for the mother, but the effect of ether on the fetus is very similar to that of chloroform. Nitrous oxide and oxygen are especially satisfactory for multiparous women and without danger for mother or child; they require constant bedside attendance of the obstetrician, even more than the so-called "twilight sleep." At the onset of each pain the patient is requested to take from four to six deep breaths; the gas is then shut off before the uterine contraction has reached its height. It does not lessen the vigor of uterine contractions. The expense of gas, if used for inhalations alone, is not excessive. Scopolamine-narcophen semianarcosis was used in 393 cases; 15 babies were stillborn and 13 asphyxiated so deeply as to require artificial respiration.

Experiments were made to determine the influence of scopolamine on blood-pressure and on respiration; after considerable experience the writer used this method particularly as a first stage measure only. The patient's ears are stuffed with cotton and her eyes are covered to increase the effect. The first dose of scopolamine is $\frac{1}{133}$ grain; the second injection is given forty-five minutes after the first. If it is found that dilatation is complete, injections of scopolamine are stopped, as it is not desirable to give it during the second stage of labor. If the cases are properly selected the patient will usually receive three injections. The writer has abolished the memory test. The writer believes that every expectant mother has the right to demand a safe and painless management of labor which modern obstetrics makes possible.

The Value of Pelvic Measurements in Ante-natal Clinics as a Forecast of Labor. Bourne⁵⁶ believes that the importance of complete pelvimetry

⁵⁶ British Medical Journal, January 18, 1919.

cannot be overestimated, especially in primiparæ, and also in multiparæ with a history of instrumental or difficult labor. Many women show pelvic contractions of slight degree, but which may cause a very difficult labor. The extreme degree of pelvic contraction are readily recognized and receive abundant attention, but attention is called to the fact that measurements of the pelvis are not a certain means of knowing the size of the pelvic brim, for in slighter degree of contraction the measurements often give no real information, and pelvimetry must be complemented by other methods of critical examination. Three measurements are of special importance and should always be made, and the fourth may be estimated: One is the interspinous, the second the intercrystal and the third the external conjugate. The posterior interspinus may also be measured.

No matter how exact the pelvic measurements may be, a slight degree of contraction is often undetected unless the engagement of the fetal head is carefully examined. The best possible measurement of the pelvis is the descent and fitting of the fetal head through the pelvic brim into the cavity. When, however, the head can be pressed down into the pelvis it evidently is not too large to pass. One recognizes the head as floating above the brim, movable at the brim or engaged. If the head is floating or too high, attempt should be made to force it down to the pelvic brim to gain an idea of any disproportion which may exist between the head and pelvic brim. The head may be easily depressed into the pelvis past the promontory of the sacrum, or it may be possible to bring it only a short distance into the brim, or it may be found that the head will not descend at all by any pressure which can be safely applied. Bimanual examination in these cases is useful by which, with the patient lying upon the back, the finger of the right hand is held within the vagina so as to touch the vertex if this can be reached, while the left grasps the head and attempts to force it down. By this means the degree of descent, too small to be recognized by the abdominal hand alone, readily becomes apparent, but descent alone is not sufficient; if the head is very high it may be impossible to bring it actually into or through the pelvic brim.

As regards the management of these cases, if the measurements are contracted, but if the head is observed to engage or can be made to engage, pregnancy should not be interrupted. If, however, in the last weeks of gestation the head does not descend or only slightly passes into the brim, attempt should be made to cause descent. From the thirtieth to the thirty-fifth week this manipulation is often successful. If, however, the head will not enter by manipulation the induction of labor may be immediately performed, with the hope that good uterine pains will cause engagement. Labor should not be induced too soon in these cases, and every opportunity should be given the head to descend and engage in the pelvic brim.

When the head remains floating and incapable of engaging or descent before the thirty-sixth week, Cesarean section may be the best treatment. It is very important that physicians who have antenatal clinics should look carefully for the slightest degree of pelvic contraction; these

cases are apt to go unrecognized and result in prolonged labor at term, with a high rate of mortality and morbidity, and great risk to the child's life.

A Comparative Study of the Mechanism of Labor. Pfeiffer⁵⁷ has compared the mechanism of labor in the human and other animals. He finds that in women the false pelvis is well developed, while in quadrupeds there is none. The axis of the pelvis is curved in women and a straight line in quadrupeds. In women dystocia is frequently caused by pelvic deformity, in animals seldom, if ever. With quadrupeds the promontory of the sacrum is not well marked, does not interfere with descent and may be reduced in degree by posture. With women the promontory is marked, is responsible for the entrance of the head in oblique diameter and is probably impossible to reduce in any degree by posture. In cows, occasionally a pendulous abdomen causes dystocia, very rarely in the mare; in women it often produces face, brow and transverse presentation. Dystocia is most often caused in quadrupeds by malpresentation; in women, dystocia is more often due to anomalies of passages and less often to deficient power. In animals premature rupture of the membrane is unknown because the force of the uterine contraction acts at right angles to the force of gravity; in women they frequently rupture early, especially in malpresentations; posture, which is now used in women to save the membrane, could logically be employed until the head is engaged, and for the same purpose. The recumbent posture will also direct the force of uterine contractions more accurately into the brim.

In quadrupeds the head of the fetus is conical, is born in extension between the extended forelegs; in women the fetus is globular, born in flexion, occasionally in extension, as in face presentation, the arms accompanying making abnormal delivery. While in women the molding of the fetus is a prominent part of the mechanism of labor, in the fetus of the cow and mare it is practically negligible. In women probably the shape of the pelvis, its inclination, ischial spines or inclined planes are not concerned in rotation, the intact pelvic floor being the chief agent. In quadrupeds rotation does occur, though seldom, and its cause is unknown.

The Choice of Rectal over Vaginal Examinations during Labor. Bartholomew⁵⁸ believes that rectal examinations during labor are much safer and more efficient than the usual methods of vaginal examination. In the rectal method the glove lubricated with vaseline is sufficient. The examination is quickly made without the need of preliminary cleansing on the part of the doctor or patient, and it is said the practice enables the physician to make as accurate examination by this method as by any other.

In the early stage of labor on rectal examination the cervix will be felt high up in the midline as a soft projection, with a well-defined thick rim into the opening of which the end of the finger passes and comes against the presenting part. As labor progresses, this cervical projec-

⁵⁷ American Journal of Obstetrics, January, 1919.

⁵⁸ Ibid., October, 1918.

tion gradually disappears. The degree of dilatation can be ascertained by palpating against the smooth, firm resistance of the presenting part. When the edge of the cervix becomes exceedingly thin it may not be detected by rectal examination, but this is uncommon and no essential harm could result from the failure to detect its presence. Fetal parts can be recognized as readily by rectal as by vaginal examination. It is alleged that vaginal examination causes puerperal septic infection, and therefore rectal method is much safer. In border-line cases of pelvic contraction, when it is desirable to have the patient pass through the test of labor, reserving the possibility of abdominal Cesarean section or pubiotomy, should one of these be necessary, rectal examination is especially valuable, as it avoids the possibility of vaginal contamination; it also prevents the early rupture of the membranes. It is alleged that nurses are often required to examine cases in which labor develops with unexpected rapidity or some complication arises suddenly, and that the rectal method is safer also for the nurse.

The Induction of Labor at Term. Reed⁵⁹ reports his results in 100 cases in which labor was induced at term. His arguments consist in a statement that by this method there is a scientific control of labor from the very beginning, replacing the watchful waiting policy of the midwife, and puts the patient where she belongs in the domain of clean surgery. Many advantages are alleged in the avoidance of overgrowth of the fetus, selection of a suitable time for labor, the lessening of the mother's suffering and the thorough control of labor by the obstetrician. The Voorhees bag is used to dilate the cervix and to bring on labor. The bag is expelled by labor pains. The patient is prepared by thorough evacuation of the bowels, with antiseptic precautions. The patient is placed on the table in the lithotomy position, the vagina retracted; a smear is made from the cervix and the mucous membrane of the colon with a pledget of gauze on forceps. Anesthesia is only occasionally necessary, even in primiparae. The bag is distended before it is introduced, the cervix is brought down by volsella forceps, and even in primiparae the os is sufficiently patulous to admit the bag; if not, the os must be dilated. The bag is then introduced and moderately distended, and if pains do not start within an hour, or if additional pressure is desired, as in placenta previa, or for some other reason for rapid dilatation, a weight of one or two pounds is attached to the protruding tube connected with the bag and passed over the foot of the bed. Usually in from five to thirty minutes uterine contractions begin and proceed rhythmically. In three hours and nineteen minutes, average time, the bag is expelled by strong pain, dilatation being complete, the head descends and the membranes rupture and the second stage begins. This is conducted as usual, pituitrin being given if the pains are deficient; if the pains are strong, morphine-scopolamine or gas and chloroform are employed. The tedious first stage is materially shortened. If the membranes rupture when the bag is inserted, an internal examination should be made after the bag is expelled to detect the presence of version

⁵⁹ *Surgery, Gynecology and Obstetrics*, August, 1918.

or prolapsus of the cord. If weight is used it should be lifted at half-hour intervals to observe the effect on the pain.

In the 10 cases thus treated the average duration of labor was eight hours eight minutes, the longest twenty-eight hours, the shortest one hour. The shortest in primipara was one hour twenty-five minutes. Three times the bag broke, but was reinserted only once. The membranes were ruptured while introducing the bag five times; in one case of polyhydramnios the rupture was intentional. There were no maternal deaths. The average weight of the children was 7 pounds 2 ounces and there were 5 deaths, 2 of which were premature, 1 toxemic and 2 stillborn. Forceps were used sixteen times, version and extraction was done twice. The average time for expulsion of the bag was three hours and nineteen minutes and the longest time of retaining the bag in the cervix was nine hours, the shortest time was ten minutes. In 41 cases pituitrin was used; episiotomy was done in 10; tears, second degree or less, occurred in 12. A rigid os was present in 3, and labor was prolonged. In all but 2 cases weights were applied, making just sufficient traction to keep up a mild pressure on the cervix. In only 1 case was it necessary to dilate the os before inserting the bag. In 5 cases a few whiffs of chloroform were given during the introduction of the bag to control nervousness. Involution was normal in all cases.

It is stated that the most difficult cases for this method are multiparæ with much cicatricial tissue in the cervix and primiparæ with unusually thick and hard cervix. It is believed, however, that these patients will do better by this method than without. It is thought that they should be considered as pathological in the class with contracted pelves. It is claimed for this method that it is in strict harmony with the principles of modern scientific surgery.

Significance of Fever at the Time of Labor. Slemons⁶⁰ states that from 2 to 3 per cent. of women have a temperature above 101° F. in labor. In severe cases this may begin with a chill, and the rise of temperature becomes considerable. The pulse-rate also increases, patients are considerably exhausted, uterine contraction ceases or becomes irregular. In the most serious cases the uterus becomes tympanic and the odor of the amniotic fluid is that of decomposition. The fever continues after the birth of the child in these cases. Fever caused by the beginning of the secretion of milk is often unnoticed unless temperatures are taken as a matter of routine. In these cases fever generally ranges from 100° to 102° F. The pulse is slightly disturbed only, and there is no chill. The patient complains of no symptoms and her expression is that of a healthy parturient.

The origin of mild fever occurring during labor is thought to be infection at the placental site, and this has been determined by examining the placenta by staining and identifying bacteria in the placenta. In 34 cases the histology of the placenta was studied, bacteria were found in the subamniotic connective tissue in contact with the large fetal bloodvessels, occasionally actually penetrating the walls of the vessels.

⁶⁰ American Journal of Obstetrics, September, 1918.

The epithelium covering the villi was usually intact, the capillaries normal and bacteria are not demonstrable on the surface or in the interior of the villi. The infection therefore does not proceed from the mother's circulation, nor does it pass through the walls of the villi. Bacteria gain access to the vessels by way of amnion or amniotic fluid, the latter becoming infected because the membrane ruptured prematurely in prolonged labor with repeated vaginal examination.

The lesion is an acute exudate infiltration beginning in the fetal surfaces of the placenta and involving those bloodvessels in which the membrane ruptured prematurely. The epithelium covering the amnion changes its form and becomes tall and narrow; its nuclei are sometimes actually forced through the cell membrane. The function of these cells is greatly impaired or terminated, and they are usually desquamated, leaving the amniotic tissue uncovered; it seems probably that through this opening bacteria enter the placenta. This complication is more serious for the child than for the mother; death occurs usually before, or shortly after, birth. The writer believes that only syphilis and birth injuries exceed this method of infection as causes for fetal mortality.

Organisms may also enter the placenta directly from the maternal blood stream; they may pass from the peritoneal cavity down the Fallopian tubes; they may ascend from the vagina through the cervix. Hematogenic infection of the amniotic fluid may happen in maternal septicemia in rare cases. In 600 labors placental bacteremia was diagnosed in 10; in another series of 1000 cases of labor, in only 24. Its frequency is estimated as 2 per cent. of all labor. A blood culture will usually give information concerning the probable character of the puerperal period in these cases. Usually such cultures are negative, and hence a good prognosis may be given when positive puerperal sepsis is present. Blood cultures made at the time of labor have no prognostic importance. The degree of fever during labor is not significant, for the patient may have a normal puerperal period, though during labor the temperature has risen to 102° F., or even higher. There is, however, a high puerperal morbidity among these patients estimated at 63 per cent., while the puerperal mortality is estimated at 6.2 per cent. Fetal mortality ranges from 18 per cent. to 61 per cent. In Slemmon's experience it was 40 per cent.; in some cases other causes of fetal death were present, and hence it is impossible to determine accurately to just what extent placental infection was the potent cause.

While our knowledge of this subject is not complete, we are reasonably sure that intraperitoneal infection is an important cause of fetal death, and that it proceeds by the umbilical vessels. If the amniotic liquid is infected the bacteria may cross the amnion and invade the placental vessels which carry blood to the fetus. In many of these cases the infection of the subamniotic tissue has been noted, and streptococci have been demonstrated in the vessels on the fetal surfaces of the placenta and also in the umbilical vein.

An examination of the placenta for bacteria will occasionally establish the cause of fetal death. Cases formerly ascribed to imperfect nursery hygiene can thus be demonstrated to result from this method

of infection occurring during labor. The finding of streptococci in the placenta would make this diagnosis sure. In other cases the clinical diagnosis was hemophilia, and human blood serum was given without effect and an ordinary autopsy added nothing. In several other cases the cause of the death of the fetus was not established clinically nor by postmortem, and without study of the placenta the diagnosis could not have been made.

Placenta bacteremia is not always followed by the death of the fetus or the newly born child. The fetal bloodvessels do not necessarily become involved, the period of time elapsing between the invasion of the amnion and birth of the infant may be too short for the organism to reach the bloodvessels in question. While we have not sufficient data to make an accurate estimation of the part played by placental bacteria in infant mortality, they must be looked on as an important factor and will explain many cases otherwise obscure. The routine study of the placenta to demonstrate bacteria in its substances should be undertaken not only when labor is febrile, but if it is prolonged after the membrane is ruptured. As a matter of routine in hospital practice, the placenta should be carefully examined. One in four or five placenta shows abnormalities, and important knowledge is often gained when least expected. Such examinations should not only embrace the weight, dimensions and degree of separation of the placenta, but portions should also be selected for microscopic examination. The result of this will not only be to the advantage of the patient, but will give valuable knowledge to antenatal pathology. From this knowledge, improvement in the hygiene of pregnancy should result and a greater saving of fetal life.

Hematoma Impeding Delivery, a Somewhat Rare Complication. A hematoma developing in the vulva or vagina and impeding delivery is described by Peterson and Tofte;⁶¹ in this case the blood tumor developed during labor and was sufficiently great in size to make vaginal delivery impossible without the evacuation of the blood; accordingly the hematoma was incised and the child delivered. The clot was drawn out and the bleeding vessels ligated, the cavity thoroughly cleansed and made antiseptic and the incision sutured with deeply buried sutures, so as to completely obliterate the cavity; the result was satisfactory.

In a case occurring in the experience of the reviewer a large hematoma formed in one of the labia and rapidly increased in size; under anesthesia the tumor was incised along the outer border through continuous tissue; the clot was drawn out, bleeding vessels ligated and a packing of 10 per cent. iodoform gauze introduced, as the cavity was so large that it could not readily be obliterated by suture. Incision was then closed except at its lowest point, where the gauze drain emerged. Pressure was then made with copious gauze dressing and bandage and special care was taken to maintain antiseptic precautions. The gauze was gradually removed, pressure being kept up over the site of the tumor, and a good result followed. After the removal of the clot the child was delivered by forceps before the incision into the tumor was

⁶¹ Ugeskraeft fer Laeger, Copenhagen, August 8, 1918.

sutured. During delivery the site of the tumor was temporarily packed with 10 per cent. iodoform gauze.

Labor in Old Primipara. Kouwer⁶² studied this subject in the obstetrical clinic at Utrecht, his material being 5300 labors in the wards of the University Hospital. He found that the duration of labor increased with the age of the primiparae, and this occurs usually because of the diminution in the contraction of the uterus. The number of forceps applications increased in the same proportion. After the twenty-fourth year the influence of age is very evident, and probably this results from the functional weakening of all the organs. The alteration in the organs includes the glands acting upon the uterus and producing the retarded development of the genital organs in woman. Starting from the twenty-fourth year, uterine inertia becomes more common and toxemia and eclampsia increased in frequency. At twenty years the first labor averaged fifteen hours, at twenty-four years sixteen hours, twenty to twenty-seven years thirty-eight hours, with steady increase. In patients averaging twenty years the forceps were applied 5.4 per cent. times; at twenty-four years, 7.05 per cent. times; thirty to thirty-seven years, 21.3 per cent. times; thirty-eight to forty-seven years, 34.3 per cent. times. Eclampsia increased from 0.01 to 1 per cent. between the age of twenty to twenty-four years respectively and 3.3 between thirty-eight and forty-three years. The albuminuria increased from 12.3 to 21.5 at twenty and twenty-four years and 34.2 at thirty-eight to forty-seven years.

The Use and Abuse of Pituitary Extract in Labor. Kosmak⁶³ reviews the general situation concerning the use of pituitary extract and finds there has been much harm produced by this substance, but that it has a legitimate indication. The writer's experience leads him to believe that the use of pituitary extract is attended with considerable danger. He cites a typical example of a patient who had moderate toxemia of pregnancy for which labor was induced. Slow dilatation was made with bags, but labor pains were ineffective and the head did not engage, although the pelvis was not contracted. Extraperitoneal Cesarean section was decided upon and the house physician was directed to give 1 c.c. of pituitary extract after the abdominal incision had been made; but an error occurred and the pituitary extract was given before the incision was begun. When the uterus was exposed it had contracted so firmly around the head of the child that considerable force was needed to extract the head with forceps, resulting in the tearing of the suture and entering of the uterine contents into the general peritoneal cavity. The child was deeply asphyxiated and did not respond to efforts at resuscitation. In another patient, a primipara, three successive doses of 1 c.c. were given by the attending physician because of apparent inertia. Upon admission to the hospital she was exhausted, the head moderately well engaged and the fetal heart not audible. The uterus was in tonic contraction, with well-marked Bandl's ring. The cervix was almost fully dilated, with membranes ruptured. A craniotomy was indicated and completed, with slight lacerations of the vulvar outlet.

⁶² Archives mensuelle de Obstetrique, 1917, vol. vi, p. 207.

⁶³ Journal of the American Medical Association, October 5, 1918.

The writer believes that the average dose of 1 c.c. is too much and that $\frac{1}{3}$ c.c., or 5 minims, is sufficient. He recognizes the fact that pituitary extract may do good in other conditions than obstetrics.

The Management of Labor in Narrow Pelves. Zinke⁶⁴ in writing upon this subject, reviews the literature and calls attention to the rules for treatment. When the true conjugate of the pelvis is between 7 and 5 cm., natural delivery is made possible only by reducing the size of the child's head. With conjugate below 5 cm., although the child's head be crushed, it cannot safely be delivered. When conjugate measures from 7 to 5 cm. a Cesarean section is indicated in the interest of the child, while below 5 cm. the indication for section is positive because this is the only safe procedure for both mother and child. When the conditions for asepsis are favorable and skilled assistance is available, and the patient has been uninjured by previous attempts at delivery, Cesarean section may be performed for the relative indication. When labor has lasted a long time the amniotic liquid is completely discharged, frequent examinations have been made and attempts at delivery, or if the patient is infected, the prognosis for section is far less favorable, as the life of the child is already compromised, in the interests of the mother, craniotomy may be indicated.

In border-line cases, if the head is well flexed and engages, the use of the forceps is indicated. Forceps, however, should not be applied when the head is arrested above the brim. With a true conjugate of 9 and 7 cm. the degree of pelvic contraction alone cannot be taken as a positive indication. The size and consistency of the head is of great importance, also the question whether it is well flexed and in favorable position and whether the uterus and abdominal muscles are acting vigorously. These factors do not develop until the membranes have ruptured, and therefore, in the beginning of labor, positive decision cannot be made. In narrow pelves, the membranes often rupture prematurely. This greatly complicates the case by prolonging labor and opening avenues for infection, hence the membranes should be kept unruptured as long as possible. Patients should remain quietly in bed and avoid sudden and active movements. When the membranes fill extensively with amniotic liquid and protrude, an elastic bag may be used to prevent them from descending too far into the vagina. The bag may often be employed to complete cervical dilatation and thus assist in labor.

When the os is fully dilated a very careful study of the case must be made to determine the degree of disproportion. An effort should be made to press the head into the pelvic inlet with bimanual manipulations and examination. If the sagittal suture runs transversely close to the promontory or close to the symphysis pubis and only a small part of the upper parietal bone can be felt, the disproportion between the child and pelvis is great; but if the sagittal suture is near the axis of the pelvic cavity and both parietal bones can be palpated, the disproportion is not so great. In cases in which there is a large caput and in which the parts become much swollen it may be necessary to make a

⁶⁴ American Journal of Obstetrics, February, 1918.

thorough examination under an anesthetic. The question must often be decided whether prophylactic version, forceps, pubiotomy, or section should be employed. When the disproportion is small, the head well flexed and in good position and pains are regular, strong and efficient, the test of labor should be employed. Examination should be made as rarely as possible, but often enough to watch the progress of labor. Every effort should be made by the posture and pressure and by the patient's efforts to assist in the expulsion of the child. When, however, pains are deficient and the patient is exceedingly nervous and apprehensive, test of labor must be abandoned and prophylactic version be substituted. Here the writer states that obstetricians differ widely in opinion. In primiparous women prophylactic version with diameter under 8 cm. is very unfavorable for the child. In multiparous women the chances for the infant are better. Version is most easy and successful soon after the membranes have ruptured, and version gives better results for the mother than the test of labor. When the child is delivered by extraction following version and labor does not last a very long time there is less pressure and less danger of exhaustion and infection. When the position of the head is abnormal and the mechanism of labor is wanting or perverted, then prophylactic version has advantages.

The writer believes there is room for the use of forceps in contracted pelvis when the head is well flexed, in favorable position and engaged; whatever is done in such a case must be done promptly and the patient should not be allowed to suffer in prolonged and hopeless labor. Should the forceps fail, the choice remains between craniotomy, pubiotomy, symphysiotomy and Cesarean section. Repeated attempts to deliver with forceps are in the highest degree dangerous and fatal, but one careful attempt is permissible.

If the child is dead, craniotomy is indicated; if the mother's heart sounds are strong and regular it is thought that craniotomy is permissible if the patient is in her home and aseptic operative interference doubtful or impossible. If the patient is in a good hospital, craniotomy must be declined.

The pelvis may then be opened or Cesarean section performed. The writer states that most American and English obstetricians prefer Cesarean section to opening the pelvic girdle.

This article is of interest from the fact that it recommends favorably procedures which have been abandoned by the majority of obstetricians. Prophylactic version in contracted pelvis is attended by such a high infant mortality that it is rarely selected, so, too, the use of forceps in contracted pelvis is rarely chosen. Induction of labor before term or Cesarean section give much better results.

Labor Terminated by Version. Potter⁶⁵ reports a series of 515 labors in which version was performed 200 times. In addition to cases previously reported, he has now performed version in 700 cases. There was no maternal mortality following this operation. Of the series of 200 versions, 85 were in primiparæ and 115 in multiparæ. In 126 cases

⁶⁵ American Journal of Obstetrics, February, 1918.

the vertex was on the left side and posterior, in 4 the vertex was on the right side and posterior. Version was performed for many complications of labor, in fact, those covering the entire range in which an operation seems permissible. It was often done in the interests of the child. The after-coming head was delivered by forceps in 10 cases. In the last series there were 3 cases in which it was necessary to repair the perineum, and in each of these the children were above the average in size and were born living. Sixteen children were stillborn; in 1 case when abdominal Cesarean section had better have been performed. Potter employed version more frequently than any other artificial method of delivery. His maternal mortality was *nil* and morbidity less than usual; the fetal mortality was no greater than that obtained by other obstetricians who employ different methods.

His experience teaches him that version lessens the shock of labor, reduces the danger due to pressure both for mother and child and should never be undertaken unless the os is fully dilated or very easily dilatable. In the majority of occipitoposterior positions, version is the operation of choice. It is readily performed in primiparæ and multiparæ and the fetal mortality in version should not be as great as that from prolonged labor and delivery by forceps. By properly performed version, injury of the child's head is reduced to a minimum, and in face presentation, prolapsus of the cord, placenta previa and in moderately contracted pelvis, with small child, version is the best method of delivery.

Zinke⁶⁶ reviews the work of Potter and Buff in terminating pregnancy by elective version. The indication for version is the shortening of the period of labor and pain, the preservation of the mother's vitality and that of the child and the saving of time for the obstetrician. The conditions must be favorable for delivery, the pelvis must be practically normal, the child not excessive in size, dilatation practically complete and membranes not ruptured or very recently ruptured.

Labor Followed by Gangrene of Uterine Fibroids. Waldo⁶⁷ reports the case of a negro multipara admitted to the hospital with a temperature of 100° F., pulse 88, respiration 24. She gave birth normally to a living, premature child. Fever continued, with abdominal tenderness and pain; the fundus was found on a level with the umbilicus and tender. Upon examination the os was dilated and a tumor within the uterine cavity, attached by a broad base to the lower portion of the uterine wall, could readily be felt. There was profuse lochial discharge without odor. It was evident that fibroids were present. The temperature rose to 102° F., and abdominal section and panhysterectomy were performed. There was found a gangrenous fibroid, and the whole endometrium was sloughing and very foul, and the uterine wall was thick and soft, but as far as could be found there was no peritonitis. The upper end of the vagina and abdominal wall were closed. The patient had high fever after operation and the abdominal wall broke down. On the eighteenth day left lobar pneumonia developed, from which the patient gradually recovered; ultimately she made a good recovery.

⁶⁶ American Journal of Obstetrics, December, 1918.

⁶⁷ Ibid., February, 1918.

Labor Obstructed by Osteoma of the Pubes. West⁶⁸ reports the case of a patient in her second pregnancy who, two years previously, had noticed a small, hard, painless lump on the left side of the pubes. When she came for examination she was three months pregnant. Upon examination there was a hard, bony mass rising from the ramus of the pubes and almost obstructing the outlet of the pelvis. The Wassermann was negative.

Operation was performed by making an incision over the mass and cutting away the whole descending ramus of the pubes, part of the body of the pubes adjacent and the ascending ramus of the ischium and part of the tuberosity of the ischium. The soft tissue was then sutured and a small drain placed in the center. This drain was removed in forty-eight hours. The patient's tissues healed promptly and rapidly, and in two weeks she was able to sit up. Labor came on at her home spontaneously, the entire duration being about fourteen hours, and the patient gave birth to a healthy, vigorous infant.

The microscopic examination showed osteoma. Two and a half months after confinement an examination revealed a firm fibrous band extending from the body of the pubes to the tuberosity of the ischium. There was no impairment of motion and no evidence of any return of the growth.

Labor Accompanied by an Unusual Complication. Tate⁶⁹ reports the case of a patient who had never had children but who had aborted twice. She had a tumor which had been pronounced fibroid. Menstruation finally ceased and the patient became greatly crippled, unable to get about, and had attacks of vomiting and retching. Examination revealed an irregular abdominal tumor, unusually large. The mass was very uneven in contour and no heart-sounds could be heard. Five days after admission to the hospital acute appendicitis developed and the appendix was removed. It was thickened and congested and contained an enterolith, some mucus and a drop of pus. The bowel movements before and after appendectomy were exceedingly foul.

When the abdomen was opened the tumor was found to be fibroid tissue, including the lower half of the uterus up to the umbilicus and to the sides of the pelvic and abdominal walls. The balance of the tumor, the uterus, extended up to the ensiform cartilage like a full-term pregnancy. The walls of the upper uterus were very soft and of a light grayish color. The sensation to palpation was that of a soft cystic mass not like a pregnant uterus, nor could a fetal body be outlined. There was a strong suspicion of pregnancy, but its presence could not be definitely demonstrated. Following operation the patient became delirious and remained so for twelve hours, with considerable fever. On the following day, and thereafter, she was much better. By observation the writer was convinced that pregnancy existed. A diagnosis of degenerated fibroids was made, probably accompanied by pregnancy. On the following night the membranes ruptured and a dead, five months' fetus was born; following the birth of the child pus flowed

⁶⁸ American Journal of Obstetrics, February, 1918.

⁶⁹ Ibid., February, 1918.

freely from the uterine cavity, accompanied by explosions of bubbles of gas. The discharge was profuse. The walls of the uterus could not be distinctly outlined and the placenta could not be readily delivered. The odor from the discharge was most obnoxious until the expulsion of the placenta began; presently all the placenta came away, after which it became less.

The *Bacillus pyocyaneus* was found in the discharge. The patient again became delirious, with slight lucid intervals, in which she complained of violent abdominal pain. The secretion of urine was at first very scanty, but finally improved. Some time after the last placenta tissue was expelled the patient had a violent attack of hiccoughs, accompanied by offensive flatus. This was followed by repeated attacks of fainting and deep coma. A tedious recovery followed, accompanied by the discharge of more or less purulent fluid from the vagina. There were also attacks of intense itching over the body, with an eruption, and pain and stiffness of the right leg about the knee-joint. The patient ultimately made a good recovery.

Recognition and Management of Injuries Received During Labor. Skeel⁷⁰ draws attention to the importance of repairing injuries received during labor as soon as possible after the accident has occurred. He believes that limiting of vaginal examinations during labor greatly lessens the danger of infection and contamination, and therefore protects the mother. He believes that rectal examinations during labor are safer than examination through the vagina. He believes that after the abdominal examination has been made the gloved finger may be introduced into the rectum and an accurate examination be made in that manner. If labor has so been conducted the vagina should be relatively free from pathogenic bacteria. This would not hold true when the amniotic sac has been ruptured for a long time or other opportunities for infection are present.

In operative delivery the chance for contamination is greater, but the need for careful examination for injuries is also greater. After some experience with complete after-delivery injuries one can predict with considerable skill whether injuries have occurred high up in the genital canal. To do this the writer proceeds as follows:

He makes as little manipulation as possible through the vagina during labor. After delivery of the placenta, the patient is put in the lithotomy position, the labia carefully cleansed and gas analgesia is resumed. The anus is covered with either dental rubber dam or sterile towels held in position by adhesive plaster fastened to the thigh. Fresh gloves are put on and examination is begun by inspection of the cervix. The physician needs either a drop-light or a good head-light to do this satisfactorily. After cleansing, retractors are introduced, made wider in proportion to its length than the standard shape, and an assistant makes pressure on the fundus, bringing the anterior lip of the cervix to the vulva. For grasping the cervix, volcella are unsatisfactory and cervix holders of the old sponge-holder type are used. The

⁷⁰ American Journal of Obstetrics, January, 1919.

rim of the cervix is readily inspected by bringing successive portions into view, using two holders with hand-over-hand fashion for bringing down the concealed posterior lip. Sometimes the opportunity may be taken to inspect the cervix before the placenta is delivered, for the whole cervical rim often fits about the placenta as it does over a distended Voorhees bag. Occasionally, the cervix is found absolutely intact. Minor lacerations are ignored; usually the lacerations will be found at the extreme right or left side of the cervical rim, sometimes extending into the base of the broad ligament. These tears invariably involve the vaginal vault, usually extending up and down the right or left anterior sulcus. While deep tears sometimes bleed, more frequently they do not. The old rule to inspect the cervix only if bleeding occurred, certainly does not detect the majority of extensive lacerations. Occasionally, a transverse tear or cut of the anterior lip, parallel to the cervix will be seen, caused by pinching the cervix between the head and the pubis; this is usually black or extremely swollen.

If one inspects the inner surface of the cervix, he often finds lacerations of the mucous membrane of the cervix and even into the muscular wall, apparently caused by the rubbing action of the head as it moves downward, this being distinctly different from the tears due to distention of the cervical rim, which are always radial in direction.

Injuries at the upper end of the vagina are of two types, first those due to extensive or deep cervical tears, which involve the base of the broad ligament, and extend outward from the junction of the cervix and vagina. Such tears would never be recognized by the usual methods of inspection. These tears are difficult to repair, but, with the patient under anesthesia, they can usually be satisfactorily repaired, thus preventing the formation of dead scar tissue.

The second type of injury involving the upper vagina is produced by extension upward from the middle or lower portion. This sort of tear is a clean split, obliquely longitudinal in direction; it often accompanies the rotation of the head by forceps. The mucosa and levator fibers are split, and even the ischiorectal fat may be seen through the tissue. The tear usually involves only the midportion of the lateral vaginal wall; it is readily repaired and promptly heals. For the proper inspection and repair of the mid and upper vaginal tears, pressure by the assistant on the fundus is removed and the cervix holders taken off, firm gauze pressure applied to the cervix, pushing the entire uterus upward, thus smoothing out and distending the relaxed vaginal vault.

In repairing the cervix No. 2 chromatinized gut interrupted sutures are used. To avoid closing the cervix too completely the lower suture is from one-third to one-half inch from the edge; the upper sutures can then be located.

In the subpubic region tears are almost as common as in the perineum; they are produced by the practice of lifting the head toward the pubis as the child is born to avoid tears of the perineum. Such tears should be closed with fine catgut, caution being taken to avoid injuring the urethra.

In repairing the pelvic floor and perineum, No. 2 pelvic chromic gut

is used on a small needle and buried without hesitation. The mucous membrane is then trimmed and united with No. 1 gut. With more successful repair, displacement of the uterus has grown less frequent. Obstetricians should examine their patients a few weeks after labor, when a surprising number of cases of subinvolution and retroversion will be found. Many of the retroversions preceded the pregnancy and could only be corrected by operation. When there is a torn cervix and a moderate infection, the uterus will remain unduly large. Precautions are taken to prevent retrodeviation by having the patient lie on the abdomen and take the knee-chest position at about the twelfth day. Hot douches and ergot are often used in addition.

In 350 cases, the cervix and upper vagina were examined in 180. In multiparæ with known old lacerations, cervical inspection and repair are not necessary. When infection was probably present, manipulations in the vagina are avoided.

In the series there were 51 cervixes which needed repair, about 16 per cent. In 9 instances, for various reasons, such as preceding severe hemorrhage, known infection, and so forth, repair was not done. Of the 43 cervical cases repaired at delivery, 7 were unsuccessful, about 16 per cent. Of the entire 180 inspected cases, infection developed once. The use of gas has done much to make possible more careful work.

For the immediate recognition and repair of labor injuries to be successful, vaginal examination during labor should be limited or entirely avoided. Immediate inspection of the cervix with primary repair of its injuries reduces the subinvolution and uterine displacement. The routine use of buried sutures in the perineum for the repair of second degree lacerations permit accurate coaptation and restoration of the parts. Perineal lacerations are more surely repaired than the subpubic damage. Therefore, during labor, slow delivery and skill in directing the smaller diameter of the head through the vulva should be sought. Forcing the head against the pubic region produces more damage than it prevents.

Two Cases of Placenta Previa with Identical History. Taylor⁷¹ describes 2 cases of placenta previa with apparently the same etiological factor. In both these cases the women were subjected to constant vibration and disturbance of a journey soon after marriage and at the time when impregnation and conception occurred. In both instances the patients had taken a long sea voyage and had occupied apartments in the ship where vibrations were excessive.

Pelvic Hematoma Following Delivery. Broadhead⁷² reports the case of a primipara, aged twenty-six years, who failed, after eleven hours of labor, to deliver a child which was delivered by a very easy forceps operation. The child, a female, weighed eight pounds two ounces; the placenta came away readily. Immediately afterward the patient complained of pain in the rectum, which increased in severity, and was finally followed by several convulsions. The blood-pressure and

⁷¹ American Journal of Obstetrics, September, 1918.

⁷² Ibid., February, 1919.

urine were normal; these convulsions were not thought to be eclamptic and the patient was quieted with morphine and hyocine. Five hours after delivery, when the patient was catheterized, the posterior wall of the vagina was purple in color; on the following day a tense tumor was found bulging the posterior wall of the vagina upward and to the right and pushed the anterior wall of the rectum well back to the left. There was an area of hemorrhage in the skin of the left buttock near the anus about four inches in diameter, apparently a large bruise. The pulse never reached over 100 and was always of good quality; the temperature ranged between 98.4° and 101.8° for twelve days, being lower in the morning and higher in the evening. There was pain in the region of the bladder, and it was necessary to use the catheter a number of times. The pain gradually subsided. There was nothing significant in the blood count. On the twelfth day the temperature rose to 101.8° , with pulse of 94; an incision was made in the posterior vaginal wall, where there was a small opening through which dark blood was slowly draining; about 6 or 8 ounces of dark, clotted blood, without odor, was removed; the cavity was lightly packed with iodoform gauze. On the following day the temperature rose to 103.4° , but the pulse was only 94; after this the temperature steadily decreased, reaching normal on the seventh day postpartum, and so continued.

Influenza in Obstetric Patients. Farrar⁷³ reviews the literature of influenza and found a description of influenza affecting parturient women in the works of Hippocrates. He states that pregnant women attacked with influenza had, in many instances, hard labors, and after labor they became worse, and many died. Many pregnant women attacked by influenza had aborted or had premature labor. In the earlier months abortion is especially liable to occur and every third or fourth case of pregnancy attacked by influenza ended in this way. In the later months of pregnancy bronchopneumonia was common, with high mortality. During labor uterine contractions were often excessive, but lacking in force; labor was tedious and atony of the uterine muscle occurred. There was blood and profuse lochia, with slow involution. During the puerperal period the disease is especially severe and dangerous, and it may be difficult to diagnose influenza from puerperal sepsis; in influenza, throat and chest symptoms, with pain in the head and back, are present, with a high temperature but lower pulse-rate than in puerperal sepsis. Involution is slow and bleeding may continue for a considerable time.

Kosmak found that influenza produced different results, attacking in different classes of parturient women. When patients had previously been in good health and well nourished, the course of the influenza was practically the same as that in the non-pregnant.

As regards prophylaxis the writer believes that inoculation was not necessary nor desirable; it was thought more important to advise pregnant women to avoid crowds, isolate themselves immediately if cough and nasal discharge appeared, to wear face masks if there were any other

cases in the family and to keep the mouth as clean as possible by frequent rinsing with a mild antiseptic solution.

As regards hospital patients, in 21 cases there were 15 deaths and 6 recoveries; 4 were admitted after being delivered at home in the outdoor service; all came from tenement houses and were seriously ill when admitted. The majority of these cases seemed hopeless and nothing could be done for them except to make them comfortable. All were at or near term except 2 at the seventh month, and 1 each at the fourth, fifth and sixth months.

A considerable number of women in the wards had symptoms of the prevailing illness, such as nasal discharge, headache, moderate elevation of temperature and cough. The cough was the most troublesome symptom, although physical signs, excepting a few rales, were absent. The women in labor who came in with the diseases were delivered soon after admission. They were isolated in a corner of the ward. None of the milder cases developed pneumonia, nor did they apparently infect other women. The end of pregnancy by no means improved the condition of patients having pneumonia. Labor itself may be comparatively rapid and easy, but the condition of the mother afterward is usually bad. Those who had pneumonia had a tendency to edema of the lungs, and this was sometimes relieved by counterirritation. Deep cyanosis was a very grave symptom.

Pregnant women were more often affected than those who were not pregnant. In treatment, the general principles should be carried out to treat the influenza and let pregnancy take care of itself.

Induction of labor should not be resorted to unless some other cause other than the presence of influenza had developed.

Rupture of the Uterus Through the Scar of Cesarean Section. Novak⁷⁴ reports the case of a young white woman, who, in her second labor, after about two or three typical pains, was seized with severe, constant pain over the entire abdomen, with some rigidity of the abdominal wall. The diffuse pain lasted for about three days, with fever ranging from 99° to 101.5°, and slightly altered pulse, never higher than 100. After the pain subsided the patient was able to get around fairly comfortably. No fetal heart sounds were heard after this spurious labor nor did the patient perceive any fetal movements. The abdomen enlarged steadily. On vaginal examination no presenting part could be felt, the cervix being closed and firm, not feeling like that of pregnancy. A careful study of the case showed there was reason to believe that the uterus had ruptured and the fetus partly escaped into the abdominal cavity.

At operation, the placenta was found very near the incision; the amniotic sac was unruptured and contained two quarts of clear fluid. A large, partly macerated fetus was found lying in an oblique position in the abdomen, with the head above and to the right, and the extremities downward and to the left. The uterus had undergone involution after rupture, being about the size of six weeks' postpartum. The anterior wall had been split in the line of the old incision.

⁷⁴ Journal of the American Medical Association, 1918, No. 71, p. 105.

A subtotal hysterectomy was performed and the left ovary, being normal, was saved. On removal of the uterus, with the attached placenta, umbilical cord and fetus, an enormous cavity was left. The walls of this were formed by the abdominal wall and by the coils of intestines, and care was taken to leave a tightly adherent amniotic membrane as a wall for the cavity. Drains were inserted in various portions and brought out through the abdominal incision, and the abdomen very carefully and accurately closed. The patient made a good recovery.

The Cause of Death in 100,000 Confinements. Harrar⁷⁵ has studied 100,000 confinements in the New York Lying-in Hospital to determine the cause of death. Only 101,197 actual confinements at or near term formed the material for his study. The maternal mortality in the outpatient service in the tenement district was one death in 317 women confined, or 0.31 per cent. In the last eight years the maternal mortality in the outdoor tenement service fell from 1 in every 312 confinements to 1 in every 326. In the indoor service there was 1 death in every 212 women confined, or 0.47 per cent. One important reason for this higher mortality was the fact that there were more primipara in the indoor service. In outdoor service in tenements 20 out of every 100 were primipara, while in the indoor service 48 out of every 100 were primipara. In emergency cases brought to the hospital the death-rate rose very greatly; these women had never been examined before labor and no prenatal care had been received; they were sent in by midwives or doctors who had failed to deliver them. The mortality among these women was 1 in 20, or 5 per cent. The comparison between the mortality of those who came to the clinic during pregnancy and those brought to the hospital in emergency showed the value of prenatal care.

The greatest cause of death was *puerperal infection*, from this the mortality was 0.95 per 1000 in those confinements within the hospital, and 0.85 per 1000 in those confined in the outdoor tenements, among those patients brought in after delivery or brought to the hospital in emergency having been treated by midwives and doctors, more than one-third died of puerperal septic infection.

Second on the list as the cause of death was *eclampsia*, with a mortality of 0.43 in every 1000 confinements within the hospital, and 0.37 in 1000 confinements in outdoor service.

Third in frequency as a cause of death was *peritonitis after Cesarean section*. These deaths may reasonably be included among those caused by puerperal infection. After this in importance comes *rupture of the uterus and placenta previa*. In the latter the results are better among the indoor than the outdoor patients; among the indoor patients 0.26 per 1000 died of placenta previa, and among the outdoor 0.36 per 1000 died. From rupture of the uterus the mortality in the indoor was 0.26 per 1000, and in outdoor 0.28 per 1000. After these the causes of death are *nephritis, cardiac disease, pneumonia, shock and exhaustion* from prolonged labor and *postpartum hemorrhage*.

In the next series death from shock and hemorrhage from Cesarean

⁷⁵ American Journal of Obstetrics, January, 1918.

section, tuberculosis, acute toxemia of pregnancy without convulsion and accidental hemorrhage were the greatest causes of death.

The less frequent causes explaining from one to three deaths are abdominal pregnancy, rupture of the vagina, pulmonary embolism and thrombosis, cerebral hemorrhage, appendicitis, suicide in acute mania, carcinoma, brain tumor, sarcoma of the liver and ether and chloroform narcosis. There are also a considerable number 1.1 of 1 per cent., of the total number of deaths, who die suddenly from unknown causes, most of these are put down as pulmonary embolism but without autopsy to prove the diagnosis.

In the same journal, Laery gives the statistics and maternal and infant mortality in obstetric practice in Newark, N. J. These results were obtained in the practice of midwives and are published in answer to the argument that there is no place for midwives in obstetric practice in the United States. The maternal mortality in Newark among midwife cases is no higher than in other practice or in other cities. Maternal mortality in the city of Newark was 1 in 188 in 1914, while in 1916 1 in every 454. This reduction of mortality has been accomplished by the Department of Health, who have assumed charge of the midwives. In the city of Boston, where it is said that midwives do not exist, the mortality was 1 in 153. Comparing this with other large cities it is found to be especially low. Other interesting results was the good from the prenatal care in the mortality of patients delivered by midwives. Investigation of cases in which physicians had been called to terminate confinement under the charge of midwives showed that midwives were not responsible for mortality or morbidity.

Infant mortality is less in Newark where midwives attend 50 per cent. of all births. One explanation of the high mortality rate in hospitals is found in the fact that higher proportion of primiparae of all nationalities were delivered in hospitals. Among a number of our cities, Italians seem to cling most tenaciously to home for birth of the child and care of its mother.

What has been accomplished in the supervision and training of midwives may be seen from the tables which the writer adds to his report. The same thing is true in the prevention of ophthalmia.

The Delivery Room Technic. Blakely⁷⁶ contributed a useful, practical article upon this subject. The primary advantage of all hospital technic is good practical asepsis. Such regulations must be obtainable as can be followed not only by experts but by the average general practitioner who takes obstetric cases. The delivery room is maintained at a temperature of 70° to 75° F.; physicians must disinfect the hands and use sterile rubber gloves; the patient must have the external parts suitably prepared. In disinfecting the hands, soap and water, lime and soda, and some antiseptic solution are employed. Lysol, 1 and 2 per cent., is a favorite antiseptic. The various rooms and plans are arranged according to a diagram and the details of nursing and technic are carried out by nurses in a uniform manner. If time permits, the patients are given a

⁷⁶ American Journal of Obstetrics, October, 1918.

shower bath and soap-suds enema. External cleansing is thoroughly done. At labor the patient is dressed in aseptic material, the obstetrician uses a sterile operating gown and gloves and aseptic precautions are employed during labor. In normal cases the nurse gives chloroform. During and after labor the fundus of the uterus is carefully watched to secure uterine contractions. Aseptic materials for dressing the cord are always in readiness, and care is taken that various methods of dressing the cord and treating the eyes are available. Fluidextract of ergot is always in readiness as a routine method; materials for closing lacerations are also at hand. Final dressings are ready and a wheel bed is used upon which the patient, cleansed and freshly clothed is put. A binder is fastened in place and the dressing of the patient is complete. When the lithotomy position is needed, appliances are at hand for holding the patient's limbs. The arrangement is such that one nurse can manage a normal case under this method. Eleven per cent. of cases of all sorts have had a postpartum temperature of 106° F. for twenty-four hours or more; this is considered a good average. The idea of the writer is to show what can be accomplished in the average city hospital with the practice of the average physician.

Vaginal Douching. Fothergill⁷⁷ believes that vaginal douching has done much harm. Patients were given to taking douches often without medical advice. The vaginal surface has no glands and is not a mucous membrane, but is covered by squamous epithelium which, while very strong and resistant to infection, is not water-proof. The vaginal secretion oozes from the surface of the squamous epithelium and becomes mixed with leukocytes and epithelial debris; this secretion is acid in reaction and inhibits the life of most septic and pathogenic germs; thus the normal condition of the vagina is to protect against ascending infection and is usually successful in protecting the uterus. Douching washes away the internal secretion and promotes congestion and infection of the genital tract. Douching promotes hyperemia of the parts in all of the pathological conditions which may follow. Women who use douches frequently never get rid of a vaginal discharge and usually have other complaints as well. In septic cases, such as abortion, vaginal douching does not get at the site of the disease at all. Intra-uterine douching is exceedingly dangerous. Douching may cause fatal peritonitis by forcing infected material and antiseptics through the tubes and into the uterine cavity. There is no question about the value of the method which would treat uterine sepsis first by thoroughly drying the uterine cavity and then applying concentrated antiseptics with no excess of fluids. After this the uterus and vagina should be left severely alone. If the cervical canal is infected, douching is worse than useless; and if the uterus is to be disinfected at all it should be done under mild anesthesia such as the use of gas.

There is no real place for vaginal douche in obstetric practice; when lacerations in the cervix and vagina have been closed and become infected, it may be well to use antiseptic douches. In cases in which

⁷⁷ British Medical Journal, April 20, 1918.

the cervix has been torn and infection has developed, with more or less extensive deposits and inflammatory exudate, the douche may be useful to secure the absorption of the exudate.

A slow stream of normal salt solution at a temperature of 100° F. to 105° F. is an efficient and convenient method of using the douche, once or twice a day, for twelve minutes, from three to six weeks, and cannot cause injury.

Damages Recoverable for Miscarriage.⁷⁸ The Supreme Court of Oregon reverses a judgment obtained for damage for miscarriage alleged to have been caused by negligence in suddenly starting a street car from which the plaintiff was alighting in which she claimed damages not only for the injuries and pain she suffered, but also for the loss of her child. It is acknowledged that a pregnant woman may recover for pain and injury, but physical and mental, suffered by her from a miscarriage brought about by negligence of another person. She is entitled to have the pregnancy go on to natural termination and any disturbance of the period or the process is actionable. She can, however, only recover for injury to herself; she has no ground for action for the loss of her child. If there be any injury in the loss of the child it is too remote and speculative.

PUERPERAL PERIOD.

Puerperal Period Complicated by Anemia. Osler⁷⁹ reviews briefly the literature on the subject and divides the cases into four groups: One comprising those anemias following postpartum hemorrhage; such are sometimes repeated small hemorrhages seen after abortion. A case is cited in which the leukocytes were 12,800, red corpuscles 2,806,000 and in which thrombosis of the left femoral vein developed. The patient made a tedious but good recovery.

In the second group are the severe anemias of pregnancy. A patient had a large quantity of albumin in the urine. Red cells were reduced to 864,000, leukocytes 13,460, hemoglobin 20 per cent. There was extreme irregularity in the shape and size of the red cells. The patient gave birth to a stillborn child at about the seventh month, spontaneously; there was very little hemorrhage or strain. The patient gradually recovered, but with the symptoms of profound anemia. After the birth of the child, the blood showed a steady improvement.

Postpartum anemia was the third variety described. Typical cases are cited. A primipara had difficult labor without complication and on the tenth day grew pale and rapidly worse. Six weeks after confinement, the red cells were 1,200,000, hemoglobin 15 per cent., leukocytes 16,000. The patient had a chill every fourth or fifth day followed by high temperature and profuse sweating. There was no discharge or evidence of sepsis except fever and chills. The spleen was enlarged. The patient had lived in a malarial region, and there was the suspicion that this condition was present; but examination of the blood during

⁷⁸ Journal of the American Medical Association, October 26, 1918.

⁷⁹ British Medical Journal, January 4, 1919.

the chill and afterward failed to reveal the parasites. The red blood count fell to 800,000 and the patient for several weeks was in a critical condition, but gradually improved, and after four months had a normal blood count.

The fourth variety of acute anemia follows or is attendant upon postpartum sepsis. A case is cited in which the red cells were reduced to 1,000,000, leukocytes 20,000 in which the patient died on the twelfth day. The course of this case was extraordinarily rapid. In one case described by Cabot there was a diphtheritic membrane lining the uterus, although this was not true diphtheria.

Among others a case is mentioned in which retained placenta was removed by hand and the patient unquestionably infected. Another woman had fever following the birth of her eleventh child; in another patient streptococci were isolated from the blood. This case proved fatal.

In commenting upon this subject the writer remarks that no one knows the nature of the hemolytic agent in hemorrhages in postpartum cases. Some of these patients, although severely ill, make a complete recovery and subsequently bear children normally. The blood picture is of importance in estimating the outlook. When signs of rapid regeneration are present, the prognosis becomes better. Acute hemorrhage, postpartum, may be rapidly fatal from lessening of the volume of blood, but a large quantity of blood may be lost in hemorrhage, extending over several days, and yet recovery may occur. From his own observation the writer believes that danger of a grave anemia, progressive in character, is not great from a fairly profuse postpartum hemorrhage; if bleeding once stops, recovery goes on fairly well and rapidly. On the other hand, repeated small losses of blood from abortion or normal delivery may be followed by anemia out of all proportion to the quantity of blood lost. In treatment, fresh air, rest and good food, iron and arsenic are best. Arsenic is still one of the best agents known in these cases. If the blood count is very low, 20 per cent., transfusion may be employed.

Schmidt⁸⁰ reports the case of a patient suffering from fever and anemia. There was pallor and yellow discoloration of the skin without general glandular enlargement. There were heart murmurs and hyperresonance over the chest, malignant endocarditis was suspected and the hemoglobin was reduced to 24 per cent. The patient had 4 children, the last born two weeks before examination. There had been continuous irregular fever for ten days of 100° to 103°, the pulse 108 to 128, respirations 22. There was no evidence of infection in the reproductive organs. The patient was transfused directly from her husband and this was repeated a few days later; she made a slow recovery. The heart murmur disappeared and her other symptoms as well.

In another case the patient seemed almost exsanguinated, hemoglobin 10 per cent., red cells 800,000. This patient was transfused from her

⁸⁰ Surgery, Gynecology and Obstetrics, December, 1918.

husband directly from the radial artery. She made a perfect recovery. A third similar case was reported in which the hemoglobin was 23 per cent.; this fell to 17 per cent. and red cells were 930,000; at the time of transfusion the hemoglobin was 15 per cent; the second transfusion was followed by the administration of arsenic and Blaud's pills. She made a good recovery.

Another patient was admitted to the hospital with the diagnosis of puerperal septicemia. She had given birth to a dead child at term seven weeks previously, and five weeks before admission had been dilated and curetted. Since then she had fever and pain in the lower abdomen. The pulse was rapid and the patient had a chill each day, lasting half an hour or more. Physical examination was negative. There was a soft systolic murmur at the base of the heart; the patient was markedly anemic, with a lemon-yellow pigmentation of the skin. The blood culture and Widal test were negative. Transfusion produced remarkable improvement for thirty-six hours, when chills and high fever returned and the patient died. Autopsy showed pelvic abscess and metastasis in the lung and other viscera. The bone-marrow showed signs of depletion.

In the first 3 patients the Wassermann reaction was negative. Blood culture, taken from the third and fourth cases showed nothing; all the others had heart murmurs and all had hyperresonance; all except the last had normal confinements and none had hemorrhage. Each patient had one or more pregnancies. There was no leukocytosis and the temperature was irregular.

Escape of Foreign Material from the Uterine Cavity into the Uterine Veins.—Sampson⁸¹ has made a careful study of the uteri, injecting them with bismuth to determine the escape of foreign material from the uterine cavity into the veins. He finds that foreign material, such as bismuth, can often be easily forced from the cavity into the uterine veins if the endometrium has been injured or has been removed by curetting. A study of the uterus in which the veins have been injected shows large receiving sinuses radiating from the base of the endometrium into the myometrium. If these sinuses are exposed by removing the overlying endometrium and the uterus is relaxed, thus holding the lumina of the sinuses open, fluid and small solid material can escape from the uterine cavity into them and into the venous circulation outside the uterus. When pressure in the uterine cavity is greater than that in the sinuses, uterine contraction following relaxation, when there is obstruction in the cervical canal, and intra-uterine irrigation may bring about this increased pressure and force fluid, sterile or containing bacteria, into the venous circulation, and this explains one method by which puerperal infection may result.

Treatment of Puerperal Blood-stream Infection by Arsenobenzol. Miller-Chalfant⁸² report 11 cases of puerperal infection treated by the intra-venous injection of arsenobenzol in which they were able to rid the blood stream of its invading bacteria. All varieties of organisms so far

⁸¹ American Journal of Obstetrics, August, 1918.

⁸² Ibid.

encountered seem to be equally influenced. Cultures from localized abscesses are usually identical with those from the blood-stream; cultures from the uterus are rarely pure cultures. Reinfection from focal infection may and do occur, but they are not so readily influenced by the arsenobenzol as the original infection. The leukocyte count is usually low compared with the pulse and temperature. After arsenobenzol is given there is a marked increase in the leukocyte count. If, after this time, there is a decided decrease in the leukocyte count without corresponding improvement in the patient, it is probable that the patient has reinfected herself and arsenobenzol may be given without waiting for confirmation of this by laboratory report. The blood-stream is usually found to be sterile in twenty-four hours; in the cases observed by the writer always in forty-eight hours.

Experiments upon rabbits indicate that a dose of 6 mg. is necessary to secure prompt results. In suspected blood-stream infection, arsenobenzol may be given immediately after the culture has been taken, to avoid delay incident to waiting for the laboratory report.

Complete Pelvic Obstruction Due to Fibromyomata as Cause of Puerperal Psychoses. De Forrest⁸³ reports the case of a patient, aged forty years, who had a severe attack of peritonitis developing soon after marriage, pain generally on the right side and infection probably originating in the right Fallopian tube. This attack subsided without operation. Two years later another occurred similar to the first. A pelvic examination at that time revealed a small fibroma in the left half of the uterus.

When seen, it was found that an enormous increase in the patient's weight had taken place during the last six months. It was thought that pregnancy was considerably advanced. The patient could not positively decide whether she had felt life. The bowels had moved with increasing difficulty, and for forty-eight hours no fecal matter had been discharged. She was becoming more and more depressed mentally, and jaundice and general edema were slowly developing. She complained of extreme continuous pressure in the pelvis and inability to walk freely. Her sister, a trained nurse, who lived with her, had noticed the mental condition tending more and more to melancholia, and mental depression had recently greatly increased. When attempting unsuccessfully to have a movement of the bowels the patient said that a considerable quantity of water was spontaneously discharged from the vagina. Abdominal examination showed a large mass reaching to the ensiform, unusually hard and apparently a full-term uterus. On vaginal examination the cervix was high up and to the right. With much difficulty two finger-tips were passed into the cervix and the head of the fetus found to be presenting. On the following day, complete obstruction of the bowel still persisting, ether was given and the vulva and vagina were gradually dilated until the cervix could be reached. Traction on the presenting head caused the entire arm to pull away; it was found to be that of a dead and badly macerated five months' fetus. Finally, the child was delivered piece-

⁸³ American Journal of Obstetrics, February, 1918.

meal and the placenta was finally delivered. The uterine canal deviated sharply to the right, about three inches above the external os uteri. The pelvis was almost blocked by an enormous fibroid tumor, extending from the brim of the pelvis to the ensiform cartilage and apparently involving the left half of the uterus. Epsom salts were administered and a tight abdominal binder was applied over the abdomen; the patient made a slow but fairly good recovery, complicated by thrombosis of the external saphenous vein. Mammary extract was given with thyroid extract, 5 grains of each four times daily, and slowly increased until 40 grains of each were given daily. The tumor slowly decreased in size and the patient ultimately made a good convalescence.

At the end of a month the mental disturbance had entirely disappeared and the excess of adipose tissue was slowly oxidized.

The writer reports the second case of a patient suffering from acute mania of very violent type. The abdomen was enormously distended and both legs equally swollen and edematous. The patient was extremely jaundiced. The vaginal examination showed the pelvis filled with a large, hard mass, apparently a fibroid, firmly fixed in the pelvic brim. The patient was not in condition to have any operation performed, and a few hours after admission to the hospital she died. Autopsy showed an enormous fibroid completely blocking the pelvis; in addition, the patient was pregnant; the fetus, about eight months old, had been dead for some time and a moderate degree of maceration had begun. The entire intestinal canal was distended, the large intestines being five inches in diameter and filled with very offensive fecal matter; the small intestine was distended with similar contents partly digested. The stomach was flattened against the diaphragm and was nearly empty. The gall-bladder was distended with bile, but so compressed with upward pressure that the dark semifluid bile could only be expressed through the duct with great difficulty.

Retained Secundines. J. E. Davis⁸⁴ has made a study of the literature of this subject. He finds that in 103,800 obstetric cases, Doleris found 8549 abortions, or 8.2 per cent. Many American and English obstetricians estimate the frequency of abortion at 10 per cent. of all pregnancies. Incomplete abortion, the writer states from his review of the literature, occurs in 72 per cent., infection develops in 45 per cent. of incomplete abortions and 78 per cent. of criminal abortions. As to the cause of abortion, 50 to 65 per cent. are criminal. Those previously aborting are 23.2 per cent. Syphilis is a direct cause of abortion in 4 per cent., and an indirect cause in a very large percentage not stated. Endometritis causes abortion in 10 per cent. Mortality of abortion is 9.75 times greater than that of childbirth. The percentage of death following abortion is 3.9, while the percentage of death following confinement is 0.4 per cent.

It is very difficult to make a positive and accurate diagnosis of abortion; patients will often decline to answer or give misleading information. In many cases malpositions, especially backward displacement of the

⁸⁴ American Journal of Obstetrics, February, 1918.

uterus, make drainage difficult and favor complications. In 82 per cent. of criminal abortions abortion was incomplete, and in the same series 78.05 per cent. were infected, and of these 34.37 per cent. were infected with streptococci. Careful observers believe that 50 per cent. of abortions occur from syphilis. The pathology of abortion cannot be understood without careful study of the circulation of the embryo, and especially of the circulation of the membrane which surrounds it.

Pituitary Extracts and the Occurrence of Diabetes in Parturient Women. Gentili⁸⁵ describes the case of a woman who had borne 5 children and who had fever after one confinement and delayed recovery after two others. She suffered during pregnancy from polyuria. She also had great thirst, weariness, insomnia and abundant metrorrhagia. From the seventh month there were signs of osteomalacia and beginning deformity of the skeleton. The patient's general health failed very steadily, with loss of weight, persistence of polyuria also. An attempt was made to treat the patient with extract of the hypophysis, but this produced but temporary improvement. At eight months labor was induced by the introduction of a bougie; there was slight inertia during the expulsive period, which was overcome by injections of pituitrin. The child was living and the postpartum period was normal. The patient's symptoms gradually improved.

The writer endeavors to connect the condition of the patient before delivery with some lack of function or lack of substance in the hypophysis. The posterior lobe of the gland is usually affected and during pregnancy this substance causes modification of the urine. It seems logical to believe that the condition known as diabetes, affecting the parturient and pregnant woman, has its cause in some disturbance of one or more of the glands of internal secretion.

Bichloride of Mercury Poisoning. Rosenbloom⁸⁶ successfully treated a case of bichloride of mercury poisoning. The patient, aged thirty-five years, chewed and swallowed three $7\frac{1}{2}$ -grain tablets of bichloride of mercury. The treatment consisted in giving at once the whites of three eggs beaten in a quart of milk and then emptying the stomach by siphonage, then 300 c.c. of fresh calcium sulphide solution, containing 1 grain to 1 ounce of water by mouth. The stomach was copiously washed with fresh calcium sulphide solution, 1 grain to 1 ounce of water. Later, if the patient could swallow, 0.36 gram of sodium phosphite and 0.24 gram of sodium acetate were given in powder or tablet form. If this is not available, sodium hypophosphite 1 gram, water 10 mls. and hydrogen peroxide 5 mls., ten times as much of the hypophosphite as was the quantity of poison swallowed, should be the rule clinically. The stomach should be washed out as often as necessary with the antidote prescribed, diluted twenty times. Give the undiluted antidote every eight hours for two days.

Pour through the stomach-tube, after the lavage, a solution of 3 ounces of sodium sulphate and 6 ounces of water, containing 5 grains of calcium sulphide. Give intravenously after withdrawing 600 c.c.

⁸⁵ *Annali di Ostetricia e Ginecologie*, 1917, No. 41, p. 173.

⁸⁶ *American Journal of the Medical Sciences*, March, 1919.

of blood, 800 c.c. of Fisher's solution or bicarbonate glucose solution. The stomach should be irrigated morning and night, giving, after each irrigation, 5 grains of calcium sulphide dissolved in 3 ounces of water. This lavage should be continued until the material pumped from the stomach, when tested by Elliott's method, is found free from reaction of mercury. Give high colonic irrigations of warm water night and morning, using 8 gallons of water for each treatment. A hot pack twice daily and 8 ounces of milk every two hours are important parts of the treatment. A mixture containing bitartrate of potassium, sodium citrate, sucrose and lactose, with lemon juice and water, should be administered freely. The patient should drink large quantities of alkaline waters; they should have a high carbohydrate diet for four weeks, but the percentage of fat and protein should be lowered. Salt should not be taken in the food, as it increases the absorption of mercury from the stomach. By the constant drip method a solution containing 1 dram of potassium acetate, 4 drams of glucose, and 3 drams of sodium bicarbonate to the pint. The patient's urine should be kept alkaline by methyl red. At least three weeks' time will be occupied by a recovery, during which time the treatment outlined should be carried out strictly.

Bichloride of mercury poisoning has grown less frequent, since the use of this antiseptic has been limited strictly to the external parts, occasionally vaginal douches of 1 to 2000 bichloride solution are given and dressings impregnated with bichloride of mercury are often put over the vulva. Formerly, when bichloride of mercury douches were given, even within the uterus, poisoning was not uncommon. It was customary to follow the antiseptic injection by a douche of boiled water, but this was not sufficient to avoid danger of bichloride of mercury poisoning, for a vaginal douche 1 to 1000 or 2000 solution, ending fatally, has also been reported. On the other hand this is an antiseptic most relied upon for rendering the hands antiseptic. Poisoning from this substance really occurs, and it is well to know what method has proved successful.

The New Psychology Applied to Parturient Functions of Women.—Graves⁸⁷ draws attention to the importance of dealing with the nervous element in all disorders of women. From time immemorial it has been believed that there is an intimate relation between the female genital organs and the nervous system. The neurologist, obstetrician and gynecologist discuss these cases from different standpoints and find their combined observations give a correct solution of the patient's condition. Freud showed that neurotic states are the result of disquieting memories or inclinations, often dating back to childhood, which have often been repressed in the field of unconsciousness. He believes that the constant repression of emotions, many of sexual nature, result in a continuous psychic struggle of which the patient is unaware, but which causes neurotic symptoms. Freud at first thought by hypnosis to disturb this abnormal condition, but finding hypnosis

⁸⁷ American Journal of Obstetrics, October, 1918.

uncertain and sometimes dangerous, he abandoned it. He was able, however, to demonstrate the immense importance of dream thought and to interpret to some extent the symbols found in dreams. The importance of a knowledge of this matter to those who practise obstetrics and gynecology must be evident.

THE NEWBORN.

The Prematurely Born. Reber⁸⁸ has studied 152 prematurely born infants. He finds, in order to properly nourish them and to cause them to grow, that from 120 to 140 calories per kilogram of body weight must be given every day. Children may thrive even when they weighed a little over 1000 grams, that is about 2 pounds 4 ounces. The smallest infant that survived weighed 1120 grams at birth and 1010 a few days later. The greatest difficulty in these children is to get them to take the food.

The smallest chest measure of any child that survived was 21 cm., the smallest head circumference 26 cm. These children born prematurely from parents having tuberculosis or syphilis all died, and those premature children that had protracted jaundice or attacks of asphyxia usually died. Of all prematurely born children about 20 per cent. were twins. Those premature children that survive nearly all developed into healthy children with average weight and height for their years and average condition of the blood.

In the writer's hospital the use of incubators has been abandoned; infants are kept warm by two or three hot-water bottles in the bed, the head covered with a cotton padded hood and care taken to keep the child warm. In this way the infant can be fed with very little disturbance. The child must not get chilled while it is being brought from its birthplace to the institution. Immediately after birth there is a remarkable drop in temperature in these children. One child that survived had a temperature of 94° F. at one time, and a normal temperature was not attained until two weeks after birth. It seems that both the central and the peripheral regulation apparatus of the temperature is deficient. Even when premature children were thriving the evening rectal temperature was scarcely ever over 37° C. With children born at term a rectal temperature over 99° the writer regards as pathological. There were 4 premature children born of women who had eclampsia; of these 1 died; there were also 4 children whose mothers had serious disease of the heart; all of them survived. When the supply of breast milk was not adequate during the first weeks, butter-milk was especially useful. A mixture of cows' milk and gruel was also useful, probably from the retention of water from the increased ingestion of salt. The larger prematurely born infants seem to do well on diluted cows' milk alone from the very first day.

The Growth, Weight and Capacity of the Human Infant at Birth. Hammett⁸⁹ states that the weight of the infant at birth is an important factor

⁸⁸ *Correspondenz-Blatt für Schweizer Aerzte*, July 6, 1918.

⁸⁹ *American Journal of Physiology*, March, 1918.

in determining the capacity of the infant for growth. During the first two weeks after its birth it is inversely proportional to the birth weight. The ability of the infant to grow and exceed its birth-rate after the loss which follows birth is very different in the same ratio. At the completion of the time studied by the writer about 82 per cent. of the infants, weighing between 5 and 6 pounds at birth, got back and exceeded the birth weight; on the other hand but 20 per cent. of those children weighing from 10 to 11 pounds at birth got back or passed the birth weight. By these weights infants vary inversely with the birth weight.

The Protection of Infants in France. Armand-Delille⁹⁰ describes the measures taken in France to protect infants. He states that formerly in France, as in all other countries, infant mortality was very great, but families were more numerous, and so the population increased slowly in spite of the continual drain. At this time only the strongest children survived, especially those who were nursed by the mother. When the country became alarmed over the falling birth-rate the first measure taken to lessen it was the cultivation of maternal nursing.

In the work of the present time it is essential that children should be protected and the birth-rate increased if possible. In France, there are two principal laws for the protection of early childhood. The first was passed in 1874, to protect children placed by their parents in nursing homes. In these places every child under two years of age is confined to a wet-nurse; an ordinary nurse or simply a mother, comes under the protection of the Government. The second law endeavors to protect the mother during pregnancy, and also mother and child during the first four weeks after birth. It gives the mother a complete rest and assists her to begin nursing her child under good conditions. This law was put into operation in June, 1914, and it is too soon to observe its permanent results. The League Against Infant Mortality was formed in France in 1902, by Budin and Strauss, and aims to establish clinics for babies throughout the country. The first of these was founded by Pierre Budin, in 1892, at the Charity Hospital in Paris. He organized a follow-up system to trace the after-history of the infants and to give aid to the mothers. His results were so good at the Charity Hospital that other clinics were established in various hospitals and dispensaries of the city. Organizations for the improvement of infant care have also been established in various parts of France. Since the beginning of the War they have given special attention to the question of pregnant women working in munition factories or other sorts of strenuous work. The League Against Infant Mortality has also established rooms for nursing for the convenience of mothers; in factories, one or more well-aired, clean rooms, with walls painted white, are reserved for mothers. The workwomen brought their children to the room in the morning and returned at regular intervals of three hours to nurse them during the day and took them home in the evening. There are also added rooms for the sterilization of milk, restaurants where mothers can receive proper food and play-rooms for older children.

⁹⁰ Journal of the American Medical Association, July 27, 1918.

At Versailles there is an institution for children who cannot be nursed by the mothers.

As the result of the War and the calling of physicians into the army many clinics were closed and there were less facilities for caring for infants. The birth-rate since the beginning of the War fell very markedly; there has, moreover, been an increase in child mortality owing to the crowding of the large cities. The League Against Infant Mortality was able to establish a large number of societies to distribute milk to nursing mothers, care for pregnant women, open-day nurseries and in every way to care for the infant population. Asylums have also been opened at Paris, Lyons and other cities, and especially in the vicinity of factories. At munition factories they were organized to care for women and children.

A central school of puericulture has been founded in Paris; lectures have been given and other teaching has been procured. The American Red Cross in France had a children's bureau which gave efficient aid. At Lyons was organized the Infant Welfare Exhibit, which was thronged with spectators and had a wide influence. Steps were also taken by the Government to subsidize mothers; a certain amount was paid and certain restrictions were enforced upon pregnant women working in Government and munition factories. It is significant to notice that during the first year of the War infant mortality in France decreased very considerably; this was owing to the enthusiasm of the War and to the fact that all classes of the population were more active. At that time there had been felt no depressing influences or limited supply of food. As the War progressed infant mortality steadily increased until during the last year it had reached several times its ordinary rate, and, as medicine is practically under government control in France, the Government needs unquestionably to take active steps in the prevention of infant mortality.

Vesicular Dermatitis in the Newborn. Arnold⁹¹ reports an epidemic of 8 cases of vesicular dermatitis in the newborn, with 2 deaths. Three mothers and two nurses became infected, 1 mother developing lesions about the breast, while the other 2 mothers and nurses were infected on the face. In searching for the source of infection there was a possible method of contamination through the waiting-room from the dermatological clinic in which obstetric patients sometimes waited. The disease began to show itself anywhere from the fourth to the twelfth day, usually about the sixth. The lesions appeared first as small macules on various parts of the body, increasing in number. Later these macules enlarged rapidly, became pale in the center, followed by very small vesicles, which covered several square inches of surface in the course of a day. The walls of the vesicles consisted evidently of a single layer of the epidermis. The fluid was at first clear, gradually becoming more or less turbid. These vesicles ruptured spontaneously, leaving the skin red, smooth, moist and glistening, with no ulcerative invasion of the deeper layers or tendency to form crusts unless a second-

⁹¹ American Journal of Obstetrics, February, 1919.

ary mixed infection developed. After the vesicle ruptured the lesion healed rapidly or was readily controlled by treatment. In healthy infants there were few symptoms, the children continued to nurse, and recovery took place in five to eight days. In very young infants, or those fairly or badly nourished, a larger area of the skin was infected, and the prognosis was bad. Three per cent. tincture of iodine was entirely satisfactory in treatment. The vesicle was ruptured as soon as discovered and this tincture thoroughly applied three or four times a day; a rapid recovery followed.

Cultures were made from the fluid and staphylococci found in pure culture when the vesicles had not ruptured. Smears showed the staphylococci aureus, while from bouillon, kidney-shaped diplococci, with a tendency to form short chains, were discovered. By comparing these cases with others and consulting the literature upon the subject the process was readily identified as pemphigus neonatorum.

Intracranial Hemorrhage in the Newborn. Vignes⁹² believes that the permanent results of intracranial hemorrhage in the newborn are so bad that every effort must be made to clear up the extravasated blood. One must study the symptoms to determine whether the hemorrhage is above or below the tentorium. If operation is done promptly and the loss of blood is reduced to the lowest possible point, the mortality, which is now 50 per cent., should be lessened. Lumbar puncture should be tried and, if it brings blood, it is useful and should be repeated two or three times daily. Incision of the fontanelle and dura with rapid evacuation of the blood are indicated in some critical cases. When one arm shows pronounced convulsion and spasm, the skull should be opened on the opposite side. The base of the skull-flap should be 5 cm. across, and fine silk should be used to ligate each vessel which is cut. If the blood is not clotted a drain should be left for a day, and if hemorrhage in the ventricle is suspected, puncture should be made. In cases in which there is no hemorrhage, but the brain is bulging, bilateral trephining will relieve the pressure. If the symptoms are those of injury below the tentorium, the child is quiet, not screaming, but somewhat cyanotic, and has nystagmus; if blood makes its way down to the spinal subarachnoid spaces there is stiffness in the neck and diffuse rigidity with erection. In such cases lumbar puncture always shows blood and there is no bulging of the fontanelle. If the bulging is under the tentorium the occipital incision devised by Cushing should be employed.

OBSTETRIC SURGERY.

Cesarean Section. Beck⁹³ reports 37 cases of Cesarean section, with a morbidity study of 107 consecutive sections, and what he considers an important method of performing the operation. Of the 37 personal cases, one mother died in eclampsia and 3 premature infants died soon after birth. Pelvic dystocia was the indication in 16 cases; fetal dystocia from a large child in 3; cervical dystocia in 3; postoperative dystocia

⁹² La Semaine Medical, September 21, 1918.

⁹³ American Journal of Obstetrics, February, 1919.

in 1 and a large fibroid tumor in the pelvis in 2 cases. In 5 cases there was abnormal presentation, and 1 was a placenta previa; the placenta completely covered the internal os. There was 1 case of eclampsia in a primipara, with undilated cervix, and this was the only maternal death. In 1 case of chronic nephritis and in 1 with cardiac decompensation, section with sterilization was done. One patient had tuberculosis and 1 had lack of engagement in a primipara, aged thirty-three years, greatly desiring the life of the child.

The records of all the Cesarean sections performed during six years at the Long Island College Hospital, 105 in number, have been studied. These statistics show a morbidity and mortality increase in direct ratio with the length of time in which the patient has been in labor with ruptured membranes. The familiar fact that repeated vaginal examinations increased morbidity and mortality is also demonstrated.

In 105 sections, 4 mothers died, a mortality of 3.8 per cent. There were 19 cases that had been treated and repeatedly examined before admission to the hospital, of whom 3 died, a mortality of slightly under 16 per cent. Of 86 cases treated exclusively in the hospital the mortality was a trifle over 1 per cent. The morbidity of section varies from 13 to 70 per cent., and the first signs of peritoneal involvement usually develop in from five to seven days after operation. This is probably a puerperal infection followed by the extension of the infection through a stitch of the uterine wound and thence to the peritoneum. To give better peritoneal protection the writer calls attention to Kroenig's method, which utilizes the peritoneal reflexion from the bladder to cover the incision in the lower uterine segment. The writer had an opportunity to examine, postmortem, a patient who had had this operation, followed by puerperal infection, which developed peritonitis five or six days after labor. There was a plastic peritonitis on the anterior surface of the uterus, especially in the region of the wound. The upper peritoneal cavity was completely walled off by intestinal adhesions and apparently normal. The apex of the bladder flap had sloughed on covering the upper angle of the uterine wound. The remainder of this reflexion was firmly united to the underlying tissue, and completely sealed that part of the incision which it covered. In the unprotected area there was a leak. This autopsy showed that peritonitis had not resulted from infection at the time of operation. If the peritonitis had been caused by infection at time of operation it would have been more general and the clinical course in the case would have been different. This autopsy suggested to the writer the relief of the tension on the apex of the bladder reflexion by employing the upper peritoneal flap to cover part of the wound; this was successful, and so the method has since been employed.

The procedure consists in opening the abdomen through an incision slightly to one side of the midline, extending from the symphysis to about 1 cm. below the umbilicus. A transverse incision also gives good exposure. The loose peritoneum at the upper edge of the bladder is cut transversely. If done early in labor there may be some difficulty in exposing this area, but the moderate Trendelenburg's position will

overcome the difficulty. If the operation is done late in labor, it is easy to find the site of the incision. The bladder and its peritoneum are separated from the anterior surface of the uterus, as in performing abdominal hysterectomy. On the upper side of the incision the peritoneum is carefully dissected free from the uterine tissue. A pair of scissors is inserted closed and gently passed under the peritoneum in the line of cleavage; they are then opened and withdrawn; this separates the tissue completely. The superior flap, about one and a half inches long, is easily obtained. The two peritoneal flaps are retracted and sufficient uterine surface is denuded to give room for the incision; a retractor in the lower angle greatly helps the operation, as two and a half inches of the uterine incision passes through the tissue previously covered by the bladder reflexion. Pituitrin is given and the uterus is pressed upward to wall off the peritoneal cavity. A small stab wound is then made in the midline of the uterus and lengthened by the scissors. The first incision should be made below, as blood and amniotic liquid often interfere with exposing the region to be incised; even if the tissue is obscure, no harm will be done to the bladder, as it is held back by the inferior retractor and the hand is then passed into the uterine cavity below the presenting part and, acting as a vectis, aids in the delivery of the child, which is easily accomplished by downward pressure on the fundus. Should there be difficulty in extraction, the finger may be inserted into the child's mouth, the face rotated anteriorly and held in the wound while forceps are applied to the sides of the head, the head then being delivered as a face presentation.

Before the placenta and membranes are separated and removed, a deep catgut traction suture is passed through the uterine wall about 0.5 cm. below the lower angle of the wound. This is important, as the uterine tissue containing the wound rapidly sinks into the pelvis and later can be exposed with difficulty. A traction suture is placed about 0.5 cm. above the upper angle of the incision. If the assistant makes traction on this suture it will help to wall off the peritoneal cavity.

The placenta and membranes are removed by the hand or pushed through the cervix into the vagina and the dose of pituitrin is repeated. The uterus is closed by two rows of interrupted chromic catgut, the first passed through the muscle wall down to the endometrium beginning at the upper angle and ending at the lower, care being taken to close each angle. Stitches are about 1.5 cm. apart. The second series passed through half of the thickness of the muscle wall midway between the deep ones, then the traction sutures are tied, thus uniting any fibers that might have torn beyond the incision. These sutures are cut and a considerable part of the wound drops into the pelvis. The upper peritoneal flap is brought down over the upper portion of the closed uterine incision and anchored by interrupted plain catgut sutures; care must be taken to avoid the uterine incision in the midline. These sutures should not be passed into the uterine cavity. The bladder reflexion is carried about 1 cm. above the site of the original transverse incision. This laps the peritoneal flaps and thoroughly seals the uterine wound. Several superficial plain catgut sutures hold this flap in position.

The writer believes that in completely sealing off the peritoneal cavity from the closed uterine incision an important safeguard has occurred against infection, which reaches the peritoneum from infection of the uterine wound. He believes that this method should be followed out even in elective cases.

CESAREAN SECTION, ITS INDICATIONS AND LIMITATIONS. Schumann⁹⁴ calls attention to the danger of sacrificing uteri unnecessarily, because they are suspected to be infected. He believes that embryotomy should be more frequently practised in these cases. He recognized as adequate reason for section, considerable contraction of the pelvis, dystocia the result of uterine or vaginal neoplasm, rigidity or true stenosis of the cervix; placenta previa of the complete or central variety. Eclampsia rarely is an indication for operation.

The writer lays special stress upon the necessity for conservation of the uterus.

CESAREAN SECTION FOLLOWED BY SECONDARY SUTURING OF THE ABDOMINAL WOUND. Broadhead⁹⁵ performed Cesarean section on a woman married eighteen years, never before pregnant. Pelvic measurements were normal and there was a large mass of scar tissue in the left ischio-rectal fossa from a fistula which occasionally discharged. The patient was very nervous and used alcohol and cigarettes. Blood-pressure suddenly rose to 170, edema of the face and legs appeared and the urine contained 5 per cent. of albumin, many red cells and casts, and was very scanty. Section was done, the uterus and abdominal wall being closed in the usual manner. Following the operation the lochia was more profuse than usual, but nothing else developed.

About fifty-five hours after operation postpartum hemorrhage was discovered. The wound was found open along its entire length, no trace of catgut being visible. The omentum lay in the bottom of the wound and a small blood clot was found adherent to the wound edges. The prolonged bleeding seemed to indicate that the patient was purpuric; accordingly, direct transfusion of 800 c.c. of blood was done, the patient immediately showing signs of improvement; but about an hour afterward pulmonary edema developed, which responded promptly to treatment. The puerperium after the second operation was normal in every way and the patient left the hospital in excellent condition. The blood count showed practical normal conditions.

Ileus Following Abdominal Section in Women. Pinkham⁹⁶ writes at considerable length concerning ileus following abdominal section in women. In illustration he describes the case of a woman, aged forty-eight years, operated upon for pelvic adhesion and other lesions following childbirth. She made a good recovery from the anesthetic and during the night was somewhat restless; was relieved by morphine. On awaking she complained of pain in the abdomen. She was somewhat disturbed at short intervals and had nausea which did not increase nor stop on giving hot water by the mouth. Later the temperature and pulse became normal, but there was marked meteorism and more or

⁹⁴ American Journal of Obstetrics, March, 1919.

⁹⁵ Ibid., February, 1919.

⁹⁶ Ibid., April, 1918.

less discomfort. The urine was negative. On the following day the pain was worse, and at 1 o'clock a little watery fluid was vomited, which gave considerable relief; an enema was given and expelled without gas. A rectal tube was inserted for twenty minutes, with relief; at 6 o'clock in the morning an enema of oil and turpentine followed by soap-suds was immediately expelled; at 8.30 she vomited again, and this continued every half-hour. Abdominal distention increased. A large hot flaxseed poultice was applied over the abdomen. Vomiting of greenish fluid continued and no gas could be brought away by rectal tube; accordingly the abdomen was reopened and diffuse peritonitis extending over the pelvis and lower part of the abdomen was found. As the patient's condition was bad a loop of the upper ileum or jejunum was brought up and sutured into the wound then open and a No. 30 rubber tube inserted into the proximal segment. Two gauze drains were inserted into the pelvis. Vomiting ceased and the patient made a good recovery. When the enterostomy wound was open the patient rapidly lost flesh and strength from starvation, though rectal and tube-feeding were carried out carefully at intervals of two hours. After the fistula closed, strength and flesh were rapidly regained.

The writer concludes that postoperative distention, which is nearly always present, is a signal of danger and not a condition to be ignored. Differential diagnosis is not sufficiently important to demand even one hour's delay in deciding upon carrying out treatment. The greatest source of danger in ileus is vicious secretion of the upper small intestines caused by the failure of glandular interaction and dehydration by vomiting. Strict prophylaxis should include preoperative care as well as most careful attention to perfect technic at operation. Early treatment at the end of twenty-four hours is indicated and early operation if non-operative measures fail. The upper bowel should always be drained and not merely punctured, the radical cure being postponed until the patient's condition improves.

Prevention of Gas Pains. Emge⁹⁷ has studied the causation of gas pain after operation and believes that it is largely the result of violent purgation before the operation is performed. It is interesting to note that in emergency operations when there has been no opportunity for preliminary purgation the patients have comparatively few gas pains and very little disturbance. Those who perform emergency operations have been interested to observe that in these cases the intestines often give very little trouble, that it is little, if at all, distended and that it does not prolapse into the wound.

Experiments on animals show conclusively that catharsis before operation does more harm than good. Animals that have been purged are apathetic and sick-looking, and portions of the small intestines excised from these animals show rapid fatigue and are less sensitive to drugs applied locally. The majority of purged animals show increased intestinal gas and often congestion of the mesenteric circulation. There is disturbance in the muscular forces proceeding from the duodenum to

⁹⁷ Journal of the American Medical Association, September 14, 1918.

the ileum, which is so essential to the progress of food and gas toward the rectum. It has been shown that disturbance in the portal circulation prevents the absorbing of gas and tends to the production of gas.

The writer compares a number of unselected cases, in some of which the patient had been carefully prepared for operation by castor oil and enemas, while in other cases the patient had had simply a cleansing enema before the operation. The difference was very striking. The patients who had no preparation except the enema were usually comfortable, while the others were often troubled with more or less severe tympany and distress. A mixture of black coffee and salt solution were often given to patients by the drip method after operation, and it was noticed that in those patients who had been purged, some of them vomited the coffee.

Fifty patients who were prepared by castor oil and enemas were subjected to abdominal operations, and their condition was compared with 50 other patients who received no purgation. The second 50 received an enema the night before the operation and early in the morning. General diet was given the night before the operation if the operation was to be in the morning, and if operation was in the afternoon a light breakfast was given in the morning. It was found that of those who had purging 22 per cent. had severe gas pain, 30 per cent. mild gas pain, 22 per cent. had cramps and 26 per cent. had no gas pain. Of those who received no purgation, 2 per cent. had severe gas pains, 4 per cent. had mild gas pains, 28 per cent. had cramps and 66 per cent. had no gas pains. The operations done upon the second 50 were more severe and complicated than those done on the first 50, hence the results are a severe test for those who had no purgation. If there was any sign of tympany, the writer called pain in the abdomen cramp pain. This is probably caused by the empty bowel contracting violently in certain segments, and as the stimulus for a rhythmic downward motion (that is food) is missing, peristalsis seems to produce cramp-like contractions and cause suffering. In the second 50 cases observed, the patients that had gas pain had dense adhesions which had to be broken up. They also had vaginal drainage and, as soon as the drain was removed, gas pain usually ceased.

It was observed that the bowel in cases that had not been purged appeared at operation normally pale and well collapsed, while the bowel that had been purged had slight distention and a dark color. The enema alone efficiently cleansed the large bowel. As a result of these observations, purging before operation has been abandoned in the writer's clinic, the results are much better and the suffering of the patients is greatly diminished.

In hernia it was found that patients after operation were very often troubled with gas pains. The suggestion was made that giving of castor oil before operation in these patients should be stopped; this was followed by corresponding improvement and freedom from distention with gas.

In the writer's observation emergency cases of Cesarean section and other abdominal obstetric operations often do exceedingly well and show remarkable freedom from gas pains. In these patients there has

been no opportunity for purgation, and while in some of them the intestines distend while the patient is under an anesthetic, in most of them the bowel remains collapsed and gives little or no trouble during or after operation. Unquestionably, nothing more is needed for the emptying of the bowel before operation than thorough irrigation or cleansing enema.

Overlapping of the Fascia to the Posterior Vaginal Wall for the Cure of Rectocele. Bissell⁹⁸ calls attention to the importance of overlapping the fascia in the posterior vaginal wall in treating rectocele. To correct the rectocele a median longitudinal incision is made through this fascia into the cellular area which determines the line of demarcation between the vagina and rectum. This cellular tissue is now separated from the under surface of the fascia laterally down to the levator ani muscle and longitudinal to the cervical area. Sometimes this cellular area contains considerable fat. As the freeing of the cellular tissue from the fascia is continued in the direction of the cervix the incision is extended to within 1 cm. of the cervix. The vaginal flaps are trimmed longitudinally to an apparently excessive degree; the extent of this trimming must depend on the amount of redundant tissue or the size of the rectocele; on an average about half of each flap remains and the effect produced after completing the operation is that of overcorrection. The flap to the left of the operator is then carefully denuded of its mucous membrane; this is done with scissors and a thin submucous layer of tissue is left upon the fascia, which serves to maintain the fascial continuity of the flap. The flap is thus thick and resists the strain of the stitches better than the fascia alone.

The denuded flap is now severed crosswise immediately below the cervix about 1 cm. Sutures are so placed that the denuded flap will be firmly fastened under the undenuded flap. The first mattress suture should penetrate the undenuded flap from without in where the posterior and lateral vaginal walls met; it then enters the denuded flap at its upper angle from without in and within out at 0.5 cm. or more from the longitudinal cut margin of the flap. The sutures then penetrate again the undenuded flap but from within out only to the point of its entrance, usually four or five mattress sutures of chromic gut, 1 cm. apart, are inserted, and these are tied so as to complete the anchorage of the denuded flap. Three or more interrupted or mattress chromic gut sutures are now passed through the free longitudinal border of the undenuded flap and again through the fixed border of the denuded flap where the mucosa and fascia meet. A continuous chromic gut suture is used to approximate the cut edges of the mucosa.

Three months after operation the posterior vaginal wall was firm and resisting from the peritoneum to the cervix. The result of the operation was better than the operator had ever been able to secure by any other method.

The Use of Dakin Solution in the Peritoneal Cavity. Higgins⁹⁹ has found that when Dakin's solution is brought in proper contact with infected

⁹⁸ American Journal of Obstetrics, July, 1918.

⁹⁹ Ibid., September, 1918.

surfaces it destroys pus, and, if it fails to do so, it is because there is some focus not reached by the solution or because the method of using it is imperfect. There is rapid return of strength, the postoperative course is more comfortable and there is less danger of secondary complication. Any offensive-smelling discharge is destroyed almost immediately, and anything destroying pus and bad odor in surgical patients is valuable. If there be intestinal fistula its use is contra-indicated. In some cases it may delay the final healing by interfering with the normal granulating process.

MISCELLANEOUS.

The Declining Birth-rate and the Medical Profession. The *Journal of American Medical Association* (July 27, 1918) contains an editorial under the above title. It calls attention to the fact that war leads to a decline in birth-rate, but that it is by no means the foremost factor in the more permanent variation in the increment of a nation's population. Years ago the situation in France was considered serious, and a committee was appointed to study the cause of the lessened birth-rate.

It is found that the birth-rate has declined in virtually every country of the civilized world during the past five years. In the United States at the beginning of the century there were 976 children under five years for every 1000 women between fifteen and forty-four years. In 1910 there were 508 children to 1000 women at the child-bearing ages. A careful study of this phenomenon shows that the decline in birth-rate in the United States was selective in character, chiefly among the native stock of the country, while there was an increase in the foreign-born population.

It was found, in order to maintain a population with its normal rate of increase, that four children should be born to each family. It is within the province of the physician to aid in bringing about conditions which shall check this loss in the population.

Maternity Nursing. A Conference on Maternity Nursing arranged by the Central Council for District Nursing in London discussed the question as to what extent it was desirable and practicable that maternity nursing should be undertaken by the District Nursing Association. Also, what was the relation of maternity nursing to obstetrics, and should the maternity nurse hold a certificate as a graduate nurse, and also what should the hospitals do for the care of maternity cases in the homes of patients.¹⁰⁰ It was thought that the poor would not give up midwives, and that if the poor were to have maternity nursing that maternity nurses should care for cases delivered by midwives and that they should also have a midwife's license. When the patient was attended by a physician, these midwives should not act as nurses. The hospitals were in favor of extending their nursing to the homes of the poor as much as possible in confinement cases. The principal point of difference seemed to be regarding midwives and maternity nurses.

¹⁰⁰ British Medical Journal, June 15, 1918.

The Graduate Degree in Obstetrics. Litzenberg¹⁰¹ outlines what is called the Minnesota plan for raising the standard of education in medicine. This consists essentially in giving a three-year graduate course to medical students already graduates, who desire to work in some special field of medicine, surgery or research. Fellowships in different branches of medicine were established, limited to the number which clinical facilities warranted. In obstetrics and gynecology there are two in addition; there are Fellowships offered by the Mayo Foundation by which a Fellow receives \$500 the first year, \$750 the second and \$1000 the third, and must give his entire time to graduate work and must also do a limited amount of teaching to give him training as a teacher. The course embraces laboratory and clinical work, for which abundant material is provided.

Obstetric Superstitions. Titus¹⁰² calls attention to some common beliefs in obstetrics which are purely superstitious in nature. One is that if the mother raises her arms above her head it may twist the umbilical cord around the child's neck. Others will not have dental work done during pregnancy lest it should injure the child, while some believe that male children must not be allowed to cry for fear of inguinal hernia. A list of 98 superstitions was readily compiled and there must be many more which were not collected. Some of them are founded on facts, others are combinations of medicine and folk-lore as taught by the ancients, and many are exceedingly amusing. It was formerly believed that during menstruation a patient must not handle food as her touch would injure the food; it was also thought that women who had no children were likely to have an early menopause, and if a young woman missed a menstrual period that she would develop pulmonary tuberculosis. It was also believed that if women became pregnant soon after having had a child, and had no menstrual period between the two pregnancies, that the second child born could never produce children.

As regards pernicious nausea of pregnancy there are many curious beliefs. One is that the mother's nausea will stop as soon as skin has grown on the baby's body, again that the husband sometimes has the nausea of pregnancy to spare the wife. Popcorn is said to be a cure for the nausea of pregnancy. If the husband had toothache this is the first sign that the wife is pregnant, and that one may count from the time of the toothache in estimating the time of confinement. In patients having much heartburn, it is said that the baby will have a large growth of hair. Getting the feet wet will cause breaking of the amnion. It is believed by some that the baby sinks into the pelvis in the dark of the moon, and if the patient has gone over time this can be remedied by dropping a few pennies upon the floor. Regarding the means of determining when to call the doctor, the occurrence of wild pains indicates that the baby will be born two weeks later to the day.

There are various absurd beliefs concerning the influence of the mother's diet upon the sex of the child. A familiar belief is that if

¹⁰¹ American Journal of Obstetrics, September, 1918.

¹⁰² Journal of the American Medical Association, May 18, 1918.

the fetal heart sounds are above 140 the child is a female, and if below a male, is widely accepted.

Maternal impressions give rise to many superstitions; all manner of strange happenings, as black cats crossing one's path; watching a workman fall from a scaffold or stagger home drunk, are thought to produce markings on the child. If the mother touches her face the baby will be marked on the face.

It is believed by some that if the patient has a large mouth that she will have an easy labor, but if small a difficult birth. It is occasionally believed that the change in the moon starts pregnant women into labor. The first baby often comes early according to superstition and this is based upon fact. It is also believed that seven-month babies have better chance to survive than eight-month premature infants, and this probably arises from the fact that the number seven and multiples of seven have been considered lucky. Oil rubbed on the abdomen will make labor easy and the breath must not be drawn in during labor, as that draws the baby back; and if one wishes to expel the after-birth, the mother should blow into a bottle. The patient should keep her mouth shut after delivery to prevent the womb from dilating, but if the uterus relaxes and bleeds, one should put an axe under the bed with the sharp edge up in order to cut the hemorrhage, or give the patient a piece of the after-birth to eat in order to stop the bleeding. For convulsions a piece of fresh onion may be tied over the radial artery. It is also thought to be bad luck for the mother to have boy and girl twins, because in all probability the mother will not survive. If the mother does not sleep after delivery, put her shoes under the bed with toes out and this will cure the insomnia. Eating fish during the puerperal period will cause postpartum hemorrhage, and many patients believe that there should be a discharge of blood for at least forty days after the birth of the child. The patient must not have her hair combed while in bed after the birth of the child because this causes brain trouble. The ninth and tenth days of the puerperal period are important because the uterus drops back on the ninth day and the bones go back with a click on the tenth day. The patient must on no account get up after childbirth for the first time on Sunday.

There are also curious beliefs concerning the breasts: The mother's intestinal gas is transmitted to the baby through the milk; the mother must not drink water while nursing the baby because it will strangle the baby. She should not take hold of a cold scissors or any other sharp instrument because the milk will be chilled.

Godmothers, grandmothers and midwives have extraordinary beliefs concerning the care of the young child. A boy baby's umbilical cord should be left long at the stump and tied below upward. If the baby receives a teaspoonful of water immediately after birth it will never have colic. The baby will lose weight until the stump and umbilical cord come away. Both boy and girl babies occasionally have breasts engorged with secretion, and this is supposed to be caused by a witch, and therefore it is called witches' milk. Babies must be picked up or they will become liver grown. If the baby yawns, one should make the

sign of the cross over its mouth to prevent the devil from jumping down its throat. The child's finger and toe-nails should be bitten off instead of clipped for the first year so that it will not become a thief. After delivery, the mother must come downstairs backward for the first time if she is to remain well. It is also the belief that if a mother applies the baby's urine to her face and hands it will help to preserve her complexion.

While most of these superstitions are absurd, some are founded upon fact, as that which leads an ignorant mother to dress the stump of the umbilical cord with a bit of charred rag, the charring of the rag makes it sterile.

DISEASES OF THE NERVOUS SYSTEM.

BY WILLIAM G. SPILLER, M.D.

Brain Tumor. The symptom-complex of brain tumor is capable of many variations and the diagnosis may be difficult. In a case reported by Kaufmann¹ a large sarcoma was found in each occipital lobe and yet symptoms failed until very shortly before death. Headache had been very slight, and there was no choking of the disk until five days before death, when slight suggestion of choking was detected, but a moderate degree of optic atrophy had been found and vision was diminished. Fourteen days before death severe symptoms of brain tumor developed very rapidly, namely, repeated vomiting, slowness of pulse, severe headache, ataxia, vertigo and stupor passing into coma.

The delay in the appearance of symptoms in brain tumor is more common when the tumor is a glioma. It has seemed to me that the explanation is to be found in the preservation of many of the axis cylinders of the nerve fibers within the tumor. These have lost their medullary sheaths and are functioning under difficulties, and many are near the breaking point. A little increase of pressure, edema, congestion, or what not, destroys rapidly the weakened vitality of these axis cylinders and they cease to function. It is not necessary to assume that a hemorrhage has occurred within a tumor when symptoms appear suddenly and increase rapidly. I have not observed delay in the symptoms to the same extraordinary degree when the tumor is extramedullary and pressing on the brain substance, as is usually the case with endothelioma.

SIGNS OF FRONTAL LOBE LESION. Signs pointing to a lesion of the frontal lobe are of great value as their number is not great and a localization in this part of the brain frequently is difficult to make. We therefore welcome Sittig's diagnostic findings, but should like to have them confirmed by further investigations, inasmuch as the abdominal reflexes are not always reliable.

Sittig² states that in 11 cases of injury of the frontal lobe studied by him he found a diminution in the abdominal reflex on the same side as the lesion in 9 cases, in 2 this difference was detected only in the upper abdomen, in 1 case the tendon reflexes were also diminished on the same side as the abdominal reflex. This diminution of the abdominal reflex in some of the cases was the only sign of frontal lobe lesion.

DURATION OF LIFE FOR THIRTY YEARS AFTER REMOVAL OF A BRAIN TUMOR. The long duration of life after the successful removal of the tumor in the case reported by Keen and Ellis³ is unusual. The tumor

¹ *Neurologisches Centralblatt*, June 1, 1918, p. 374.

² *Zeitschrift f. d. g. Neurologie und Psychiatrie*, 1918, vol. xl, p. 342.

³ *Journal of the American Medical Association*, June 22, 1918, p. 1905.

was a fibroma, the most favorable variety for operation. The ventricle was widely open and had been so for thirty years. The chief interest of this case, aside from its long duration, is of a historical character. The operation was the first removal of a brain tumor in the living subject in Philadelphia, and followed only by two years Godlee's case in 1885, the first in which a tumor of the brain was ever operated upon.

Encephalitis Lethargica. The findings of Marinesco⁴ in 2 brains from cases of encephalitis lethargica were disseminated miliary hemorrhages visible to the naked eye in the gray matter about the floor of the fourth ventricle, the aqueduct of Sylvius, and the third ventricle, and also in the posterior part of the pons and the peduncles. The cerebral cortex, except for congestion of some of the vessels of the leptomeninges, showed neither macroscopical nor microscopical lesions. The first segment of the spinal cord, the only part obtainable, showed the same histological lesions as described above. Microscopic study of the parts affected showed: (1) Infiltration of the walls of the small vessels, and especially the veins, consisting of lymphocytes and plasma cells in the adventitia, disposed in several layers; (2) foci of interstitial inflammation consisting of neuroglia cells of several kinds with lymphocytes and polynuclears; (3) lesions of nerve cells which did not correspond with those usually seen in poliomyelitis; (4) numerous foci of hemorrhage. Marinesco from these findings regarded lethargic encephalitis as a disease entirely different from botulism, from the hemorrhagic polioencephalitis of Wernicke, from poliomyelitis, and from sleeping sickness. Like these two last-mentioned diseases it was an infectious inflammatory disease, but the nature of the infectious germs had not yet been determined. It was distinguished from botulism by its symptomatology and by the four above-mentioned histological lesions. The vascular lesions with infiltration of the walls of the vessels were absent in botulism, and the *Bacillus botulinus* had not been found.

Mott found no essential difference between epidemic encephalitis with its characteristic symptoms of fever and headache, oculomotor, facial and bulbar symptoms as difficulty in swallowing, paralysis of the soft palate and respiratory disturbance, and the pontobulbar encephalitis of poliomyelitis. It has been stated that the cerebrospinal fluid obtained by lumbar puncture contains no lymphocytes, but in some cases lymphocytes have been found.

Panton stated that the examination of the blood gave an average leukocyte count of 7600 per c.mm. and the relative proportion of the cells is about normal. The spinal fluid is clear and without any coagulum on standing, such as is found in tuberculous cases. The protein is never more than slightly increased and the cellular content is either normal or slightly increased, the type of cell being always lymphoid.

Crookshank said, in describing the cerebrospinal fluid examination, it was necessary to state the day of the disease on which the fluid was taken, as the cell count, etc., differed from day to day.

James stated that epidemic encephalitis differs from poliomyelitis

⁴ *Lancet*, November 2, 1918, p. 590.

not only in localization of the paralysis but also in its age incidence, seasonal prevalence, course, duration, and fatality. Marinesco and McIntosh, as a result of their separate researches, arrived independently at the conclusion that encephalitis lethargica is a disease *sui generis* anatomically and clinically distinct from analogous affections.

MacNalty described three types: (1) A type displaying general disturbances of the functions of the central nervous system but without localizing signs. (2) Types with nervous localizing signs; (*a*) disorders of the oculomotor nerves; (*b*) of the brain-stem and bulb and cranial nerves; (*c*) of the long tracts, pyramidal, etc.; (*d*) ataxic types (cerebellar involvement); (*e*) affections of the cerebral cortex; (*f*) types indicating spinal cord involvement; (*g*) polyneuritic types. (3) mild or abortive types with or without localizing signs in the central nervous system.

The incubation period is probably variable. The prodromal period commonly ranges from the first to the seventh day, but may be as protracted as three weeks, during which occurs lethargy, headache, giddiness, diplopia, as well as lassitude, fatigue, vomiting and diarrhea. The acute manifestations include slight early rise of temperature to 101° or 102° , marked asthenia, catalepsy, stupor (alternating with nocturnal delirium), emotional changes, changes in speech, fibrillary movements, and choreic movements of face, trunk and limbs. The rapid, complete or partial clearing of the paralysis is the most remarkable feature of the types with nervous manifestations.

Hall says the three cardinal signs are lethargy, general asthenia, and cranial nerve palsies; any one of these may predominate or may be slight or absent. The lethargy is the most striking feature. It is not true sleep. Many who have been stuporous all day become delirious at night.

Crookshank stated that of 43 cases of lethargic encephalitis in which the spinal fluid was examined, lymphocytes were found in excess in 25 cases and leukocytes in 4 cases. In 6 cases lymphocytes and in 2 cases leukocytes were in marked excess. Protein was present in excess in 26 cases.

E. Farquhar Buzzard⁵ emphasizes that in the recent epidemic of lethargic encephalitis in England there have been a few cases which have run a very malignant and rapidly fatal course of a few days, but the striking feature of the majority has been the duration of the symptoms over a period of weeks before the intensity of the process has reached its height. The age incidence and the seasonal incidence are entirely different from those of poliomyelitis. He speaks of seeing cases in which asthenia and lethargy were prominent symptoms but ocular palsies were absent. These have the clinical picture of acute paralysis agitans, with the mask-like, expressionless face, the rigid but not really paralyzed limbs, the tremor, the posture and gait of this disease. He says he will never forget his first case of this type, one in which the appearance was exactly like that of a patient who had had paralysis agitans for ten or fifteen years, and yet he was informed the man had

⁵ Lancet, December 21, 1918, p. 835.

been ill only a week. This is encephalitis with its chief incidence on the basal ganglia.

Buzzard calls attention to a form of this disease in which the force of the inflammation was spent upon the cerebral cortex and the diagnosis was difficult in regard to cerebral tumor, abscess or hemorrhage. The Wassermann reaction of the cerebrospinal fluid was negative in the four cases he reports. The patients may be over forty, or even fifty years of age, and present hemiplegia, aphasia, hemianesthesia or hemianopsia. The naked-eye examination of a brain at the necropsy table is not sufficient to discriminate between an ordinary cerebral hemorrhage and a hemorrhage which is only an accidental occurrence in the course of encephalitis. He concludes that operative intervention in the form of decompression is contra-indicated, notwithstanding the increased intracranial tension. Three of his four patients died partly, at any rate, from hemorrhage, and it is hard to believe that decompression can be beneficial when this hemorrhagic tendency exists.

As to prognosis, Buzzard says further experience may teach us more than we now know. At present we can only say that in some cases complete recovery occurs, in others the acute stage is survived but permanent defects remain, while in others death results from toxemia or hemorrhage in the acute illness or from some complication following it.

The findings he obtained in the brains he examined were: (1) Perivascular infiltration mainly with small round cells; (2) small capillary hemorrhages; (3) thrombosis of small and middle-sized vessels; (4) ischemic softening; (5) subarachnoid hemorrhages and cellular infiltration of the leptomeninges; (6) general neuroglial proliferation; (7) changes in the nerve cells.

Further information concerning this disorder is to be derived from the report of the investigation in England.⁶

The first case noted in England occurred on February 11, 1918, and the largest number of cases in one week was eighteen, in the last week of April. The number of cases declined thereafter, and the epidemic, which never attained large proportions, came, at least temporarily, to an end in June. The bacteriological investigations have not yielded positive results.

Ophthalmoplegia has been present in 75 per cent. of the cases examined. Among 168 cases, 37 deaths have been recorded. Optic neuritis has been found to be unusual.

Bassoe⁷ has reported 12 cases of this disorder with examination of the brains in 2 cases. The gross changes were similar and consisted of edema, congestion and minute hemorrhages, most numerous in the brain-stem, basal ganglia and centrum ovale. The histological findings were dense accumulations of mononuclear cells around the vessels, but little evidence of inflammation was found in the cortex or meninges. The lesions seem to be those described by other investigators as characteristic of this disease.

⁶ British Medical Journal, January 11, 1919, p. 45.

⁷ Journal of the American Medical Association, April 5, 1919, No. 14, vol. lxxii, p. 971.

Eight cases believed to be representative of this disease occurring at Camp Lee, are reported in a preliminary manner by Pothier.⁸ The most common features were vertigo, diplopia, headache, slight fever and a spinal fluid showing a definite pleocytosis (from 20 to 66 cells) of the lymphocytic type. They were characterized by a tendency to cranial nerve involvement. The patients came from widely separated organizations. Only one case resulted fatally.

Polioencephalitis. A series of 6 cases of cerebellobulbar polioencephalitis originating during or after epidemics of influenza and of poliomyelitis is reported by Mills and Wilson.⁹ These all showed disease of the basal parts of the brain and one was clearly of the type described as lethargic encephalitis or epidemic encephalitis. These cases were regarded as of the same pathological character, only differing in the location, severity and destructiveness of the lesions present. The symptomatology of the fatal and non-fatal cases, as they say, differs chiefly in the evidences of the extension and restriction of the lesions probably present. The lethargy in the sixth case may have been conditioned by the intensity of the pathological process in the region of the midbrain. These writers think the study of their cases suggests the relationship of epidemic encephalitis and epidemic influenza.

Familial Macular Degeneration with and without Dementia. The Tay-Sachs amaurotic family idiocy seemed to be a well-defined disorder, but atypical cases have led to the addition of other types, so that the distinctions have become indistinct. First came the juvenile type of amaurotic family idiocy described by Spielmeyer. This affected children older than those afflicted in the Tay-Sachs disorder, and has been recognized by Vogt, F. E. Batten, and others. Finally we have the familial macular degeneration with and without dementia.

Howard S. Clark¹⁰ tries to bring order out of confusion. He states there are great differences in these types, but analysis of many cases of familial disease seems to show a gradual transition from one to the other. The juvenile type of amaurotic family idiocy seems to merge on the one hand into the infantile type, and on the other into familial macular degeneration with dementia.

In the familial macular degeneration there is symmetrical degeneration of the macular region of the two eyes, combined in some cases with cerebral degeneration causing dementia. A macular type in which the retina alone is affected has been recognized, and a maculocerebral type in which both retina and brain are attacked. The macular type begins during the period of puberty, between the ages of twelve and fourteen years, but the maculocerebral type begins between the fifth and seventh years. The first symptom is diminution of central vision of both eyes and central scotoma for red and green, which increase gradually until, after some years, there may be complete loss of central vision. The periphery of the field of vision is unaffected and shows normal boundaries.

⁸ Journal of the American Medical Association, March 8, 1919, p. 715.

⁹ Archives of Neurology and Psychiatry, May 1, 1919, No. 5, vol. i, p. 567.

¹⁰ Journal of the American Medical Association, November 30, 1918, No. 22, vol. lxxi, p. 1799.

On account of this the patient develops eccentric fixation and finally nystagmus.

Atrophy and degeneration of the retina are almost always confined to the macular region. The type without dementia is the more common, and Clark has found reports of 37 cases of the macular type, whereas he found only 10 undoubted cases of the maculocerebral type recorded. He reports 2 new cases of the maculocerebral type. In this the failure of vision occurs simultaneously with the failure of intellect, and sometimes is accompanied by headache and convulsions, though convulsions may not set in until later in the course of the disease, and have not always been present, and are absent in the macular type.

No positive statement of the cause of this disease can be made. Syphilis is strikingly absent. In almost all the cases Gentiles have been affected, whereas the Tay-Sachs amaurotic family idiocy attacks Jews almost exclusively. Cases in which there was no blood relationship preponderate. The disease develops slowly but from three to six years is sufficient time in the maculocerebral type to change bright children with good vision to patients in a condition approaching amaurotic dementia. No paralyses are reported in either type of macular degeneration.

The resemblance of the macular degeneration to the juvenile form of amaurotic family idiocy is very close. Clark says any attempt to construct a definite syndrome and to separate sharply these forms lands the investigator in a wilderness of atypical cases. The more he analyzes the more he is convinced that the two types merge into one another in the same manner that the infantile and juvenile types of amaurotic family idiocy seem to merge. Little is known of the pathological conditions of macular degeneration with dementia, and there is no treatment.

In addition to the heredodegenerations mentioned which affect the eyes, retinitis pigmentosa should be added.

Walter¹¹ contributes to the question, whether the infantile and juvenile forms of amaurotic family idiocy represent different disorders or are modifications of one disease. From his studies he concludes that the two forms are manifestations of the same disease, that there are clinical and pathological transitional types between them, that amaurosis of visual disturbances are not necessary signs, and therefore it would be more correct to speak of "family idiocy" omitting the "amaurotic;" and that the idiocy may be of different intensity, so that the mental deficiency may be very slight.

Touch Paralysis (Tactile Agnosia). A very unusual case of this peculiar disturbance is recorded by Bonhoeffer.¹² As he says, cases in which the phenomenon exists with complete or nearly complete integrity of the different forms of sensation are very rare. Many so-called cases of touch paralysis reported in the literature are really nothing but instances of inability to combine tactile impressions because of grave disturbance of sensation, especially of the deep sensation. Bonhoeffer's patient was not aware of his condition until it was discovered during the

¹¹ Zeitschrift f. d. g. Neurologie und Psychiatrie, 1918, Nos. 4 and 5, p. 349.

¹² Monatsschrift f. Psychiatrie und Neurologie, 1918, vol. xliii, No. 3, p. 141.

medical examination. He had received a bullet wound of the head. He did not recognize the two points of a compass so well in the right hand and he had slight disturbance of pain and temperature sensations in this hand, but light touch was recognized normally everywhere in the hand, and the least movement of a joint was correctly interpreted. Objects placed in the right hand could not be recognized by contact alone unless the thumb was also employed, as touch paralysis was not present in the thumb. The man could describe the characteristics of the objects by contact alone but he did not know what the objects were. The escape of the thumb in touch paralysis has been observed in other cases and the thumb therefore is likely to escape when the fingers of the same hand are involved.

Sensory Cortical Localization. The two cases reported by Gerstmann¹³ strengthen the view steadily gaining ground that motion and sensation are separately represented in the cerebral cortex. In both cases the disturbance of sensation was about the mouth and in the thumb and thenar eminence of the same side, and the lesion was in the opposite parietal lobe. These, and similar cases to which Gerstmann refers, permit the conclusion that the sensory center for the mouth must be very near the sensory center for the thumb. Another justifiable conclusion is that pain and temperature sensations may be more disturbed from lesions of the parietal lobe than other forms of sensation, although parietal lobe lesions are more likely to disturb the senses of position, passive movement, spacing and stereognosis.

A case similar to Gerstmann's is reported by Gamper,¹⁴ but it differed in that the anesthesia was on the ulnar side of the hand and forearm, and it was thought that two lesions occurred.

Popper¹⁵ has been able to observe an unusual form of sensory disturbance from parietal lesion. A wound in the parietal lobe caused complete loss of all forms of sensation in all the fingers of the opposite hand, with less involvement of the thumb, but confined to the ends of the fingers. He is able to refer to a few similar cases in the literature.

Disturbance of Spatial Orientation and Visual Attention, with Loss of Stereoscopic Vision. The disturbances of vision are among the most interesting and important of those produced by cerebral lesions. The case carefully studied by Gordon Holmes and Gilbert Horrax¹⁶ is full of interesting details.

A soldier was injured in the occipital region by a bullet, and had entrance and exit wounds. His chief symptom was inability to orientate accurately in space objects perceived by either central or extracentral vision, and especially to recognize the absolute and relative distances of things seen, though by touch and sound he localized sensible objects as readily as normal persons. His power of distinguishing and comparing lengths and sizes was similarly affected. Stereoscopic vision was abolished; he was unable to see tridimensional objects in perspective

¹³ *Neurologisches Centralblatt*, July 1, 1918, p. 434.

¹⁴ *Monatsschrift f. Psychiatrie und Neurologie*, January, 1918, No. 1, p. 21.

¹⁵ *Neurologisches Centralblatt*, July 1, 1918, p. 447.

¹⁶ *Archives of Neurology and Psychiatry*, April, 1919, No. 4, vol. i.

and to recognize depth in anything. These symptoms disturbed the performance of various actions in which he relied on sight for guidance.

He presented a severe disturbance of visual attention, which made him unable to perceive readily or at all objects outside macular vision when his attention was held by that on which his eyes were fixed, and a failure to explore space spontaneously with his eyes; yet objects which threw even large images in his retinas were generally perceived whole. He was unable to evoke topographical memories acquired in the past and to learn his way in new surroundings. He had various anomalies of the ocular movements and reflexes, as failure to fixate promptly objects seen, to accommodate near objects, and to blink reflexly to threatening gestures.

His visual fields were reduced by blindness of both lower quadrants, but the acuity of central vision was good. The absence of aphasia and of serious mental deterioration, his intact faculties of motion and sensation, and the fact that he was an exceptionally reliable witness, made it possible to carry out many tests and observations on the nature of the special symptoms he presented, and this was done with a thoroughness which makes the reading of the report a delight.

This man showed by repeated examinations with small objects that in the whole of the upper quadrants of his visual fields retinal sensibility to both white and colors was intact, but while his eyes were fixed on anything, he noticed at the most only one other image that fell in the seeing portions of his retinas; when he gazed at the observer's face he could perceive a hand moved on either his right or his left side, but never the simultaneous movement of two hands. If the object he looked at were small and fixation required attention he occasionally failed, as long as his eyes remained accurately fixed on it, to recognize another object even if near the fixation point. He rarely moved his eyes or exhibited any interest in what was happening around him unless his attention was claimed by sounds, but he always evinced an intelligent interest in all that came into his macular vision. In walking he collided with prominent objects, though their images fell in seeing portions of his retinas.

This condition is described as a disturbance of visual attention and is said not to be uncommon as a unilateral phenomenon when lesions involve the cortex of the posterior parietal convolutions. This restriction of visual attention explains the feeble call that objects outside of macular vision made on visual perception.

The man was unable to recognize the actual position of an object and to recognize lengths and sizes, and to compare the dimensions of two similar objects; he was unable to estimate distances, and even when one object was twice as far from him as the other he could not distinguish the relative distances of the two objects, and he stated that everything appeared at the same distance from him.

The defect in his visual memory was shown by his inability to describe how he would go from the house in which he had lived for years to the railway station, or to his workshop. He did not succeed in learning his way about even when his path was simple; he seemed to acquire or retain no memory or picture of the route he had passed along. His

inability to determine accurately the spatial relations of objects seen, his tendency to neglect visual impressions that did not attract attention strongly, and his difficulty in bringing objects quickly into central vision, probably all contributed to his failure to form or retain a distinct idea or memory of his path.

Stereoscopic vision, the power of recognizing depth and thickness, in solid objects, was completely lost. Everything appeared to him flat and bidimensional; he was unable to fuse the two non-corresponding images that a solid object forms in the two eyes into a single visual concept.

This symptom-complex was believed to be possible only from bilateral injuries, and when the lesions on the lateral surfaces of the hemispheres involve the angular gyri or their neighborhood. The measurements of the positions of the wounds and of the cranial defects suggested that the missile entered through the posterior portion of the right angular gyrus and made its exit through the upper part of the corresponding gyrus of the left side.

Brain Changes Associated with Pernicious Anemia. The cord changes occurring in pernicious anemia are well known, but the changes in the brain have received less attention. Woltman¹⁷ asserts they occur more frequently than has been generally supposed. He says not only do degenerated areas of the Lichtheim type, such as are typically found in the posterior and lateral columns of the spinal cord in pernicious anemia patients, occur in the medullary portions of the brains of these cases, but they occur with about the same frequency, though their demonstration may be rendered more difficult.

Patients who show degenerative changes in the spinal cord at necropsy, usually show the same type of lesion in the brain, but in addition to these focal degenerative areas in the white matter there is a diffuse degeneration most striking in the long association tracts but also occurring elsewhere. The gray matter is not immune from the destructive process. The changes are less intense in the region of the internal capsule and pons than in higher levels of the brain or in the spinal cord. The appearance of the lesions suggests that lymph stasis is an important factor in the production of these foci.

Well-marked psychoses, such as are occasionally associated with pernicious anemia, Woltman thinks have probably little or nothing to do with these destroyed areas. The milder mental manifestations, such as somnolence, apathy and terminal delirium, are probably in a measure dependent on these lesions, though the chief causative agent of these symptoms is probably the toxin itself.

Parenchymatous Atrophy of the Cerebellum. Cerebellar function has been the subject of active study during recent years and our knowledge regarding this part of the brain has been greatly increased; we have still, however, much to learn. Suitable cases for study are rare, but such a one is afforded in the carefully observed case reported by Archambault.¹⁸ This writer speaks of a man who in youth had had temporary cerebellar

¹⁷ Archives of Internal Medicine, June, 1918, vol. xxi, pp. 791-838.

¹⁸ Journal of Nervous and Mental Disease, October, 1919, No. 4, vol. xlvi, p. 273.

symptoms on a basis of general infection. After the age of forty he began to develop a slowly progressive disequilibrium of station, gait and all voluntary movements of the extremities. His various symptoms realized in time the most severe and complete clinical picture of disordered cerebellar function. Degenerative lesions were found strictly confined to the cerebellar cortex and they caused practically a total suppression of the function of the cerebellar cortex. They were more intense in the dorsal than in the ventral lobules, and in the right than in the left hemisphere. In the majority of the lamellæ the degenerative changes involved all three layers of the cortex, but in a few lobules or segments of lobules they were practically confined to the layer of Purkinje cells. Vascular foci were wanting but the bloodvessels of the cerebellar leptomeninges had markedly thickened walls and Archambault felt that the vascular thickening was at least partly responsible for the cortical atrophy.

The symptoms were those that have been described repeatedly in connection with cerebellar disease, except the strong anteflexion of the trunk, the definite anteropulsion and the distinct rigidity, more particularly of the trunk and lower extremities. These symptoms are not usually attributed to the cerebellum but to lesions involving other structures, notably the pyramidal tracts. In Archambault's case not only the pyramidal tracts but the entire cord, bulb, pons and midbrain were intact so that all the clinical manifestations must be regarded as resulting from the isolated involvement of the cerebellum. As he says, while it is hardly justifiable to formulate any positive conclusion merely from the observation of a single case, the clinical findings in this patient were so definite and invariable, the lesions so well characterized and topographically limited, that one may legitimately further assume that the various functional disturbances were essentially symptomatic of cortical deficit. This case, therefore, is of considerable value in affirming the genuine intrinsic character of many cerebellar symptoms and incidentally serves to demonstrate that the symptoms described by Babinski, more particularly *adiadokokinesis*, *asynergy* and *cerebellar catalepsy*, are truly manifestations of disordered function.

So far as localization might be attempted in a case in which the lesions were so diffuse as in Archambault's case, it might be concluded that the superior surface of the cerebellar hemisphere is related to the upper extremity, that the posterolateral segment is concerned with movements or attitudes of adduction, whereas the mesial segment is concerned more especially with abductor movements or attitudes.

Epidemic Cerebrospinal Meningitis. In the outbreak of this disease at Camp Beauregard 126 cases occurred between November 10, 1917, and June 1, 1918, with 65 recoveries and 61 deaths, a mortality of 48.26 per cent. Landry and Hamley,¹⁹ who studied these cases, concluded that the patient, ill of the disease, is not dangerous as a disseminator of the infection, especially after active treatment has been begun. Of many throat cultures taken upon admission and during the course of the

¹⁹ American Journal of the Medical Sciences, February, 1919, p. 210.

disease, only one culture in one patient proved suspicious. Not one of the officers, nurses or enlisted men constantly in the ward during this period contracted the disease. These authors believe we must regard the carrier as the dangerous agent to others only, for they have no record of any carrier who developed the disease.

Three forms were distinguished; the ordinary frank, the fulminating and the chronic forms. They emphasize the importance of the leukocyte count in doubtful cases and refer to one case in which a diagnosis was made because of a leukocytosis of 56,000.

The eruption was present in about 50 per cent. of the cases; in their last series they found it in 80 per cent. The spots came quickly, sometimes in a few hours, necessitating frequent inspection. They also regard the disease as a blood infection with local manifestations in the cerebrospinal system. The end-results of their 65 cases discharged from the hospital as "cured" have not been very encouraging. Twenty-two of these "cured" patients had very unpleasant symptoms, and it was doubtful whether those patients who seemed to be well would be able to stand any strain.

Epididymitis in Meningitis. As a feature of meningococcus sepsis, Latham²⁰ states that epididymitis has seldom been observed. At Camp Jackson during the epidemics it assumed an important place in the list of complications of meningitis. In one series of 290 cases it occurred in more than 3 per cent. During a sporadic outbreak occurring during October, 1918, it had been much more frequent. In this series of 36 cases, more than a third of the patients developed epididymitis as a complication during convalescence. So frequently has it occurred, and so typical is its onset and its course, that it has almost been regarded as a symptom rather than a complication.

It seems to be an epididymitis without definite orchitic involvement; certainly if orchitis occurs at all, it is only slight and transient. The picture is that of a hard, sharply demarcated epididymitis, with the globus major as the primary focus in practically all of the cases. The process quickly extends to the body of the epididymis. The tunica vaginalis testis usually contains a little fluid.

The cause of the complication is in doubt. The cases of meningitis were all in men between twenty and thirty; that is, at the age of greatest sexual activity. All were treated by massive intravenous doses of antimeningococcus serum. The nature of the lesion, its localization in the epididymis, were thought to point to its being septicemic in origin.

There has been no case of relapse following this complication. There has been no relation between the severity of the clinical features of meningitis or of sepsis, and the occurrence of epididymitis as a complication.

Herrick²¹ has done much to establish that epidemic cerebrospinal meningitis is not a primary meningitis but a meningococcic sepsis with a secondary meningeal localization. About 45 per cent. of the cases he studied were recognized before meningitis developed. He says the

²⁰ Journal of the American Medical Association, January 18, 1919, p. 175.

²¹ Ibid., August 24, 1918, p. 612.

duration of the stage of generalized systemic infection without meningitis may vary from a few hours to many days; in the average case it is about forty-eight hours. In an extraordinary case which he had there were symptoms of general infection with meningococci in the blood-stream two weeks before meningitis developed. The blood culture is positive in about one-third of the cases in which this is carefully made.

The symptoms in the early stages are those of a general infection, well described in detail by Herrick, and apathy is always present. A petechial rash is present in about half the cases. When the diagnosis has been made, the attempt should be to sterilize the blood-stream by massive doses of antimeningococcic serum introduced intravenously, and intraspinal treatment also should be employed. I cannot attempt to give the method in full, for to do this would be to repeat a large part of this important paper; indeed, this paper is one of the most valuable papers which have appeared recently on this subject. It is based on the study of 265 cases of meningococcus infection observed at Camp Jackson from November, 1917, to June, 1918. A more definite idea of the general character of the disease has been established, methods of diagnosis of value have been brought into use, and a more successful treatment has been carried out.

Acute Meningococcic Endocarditis and Septicemia. It would seem that the meningococcus enters the body in different ways. The nasopharyngeal route has been accepted, but whether the organisms reach the meninges by way of the blood-stream or more directly by the olfactory nerves or ethmoid sinuses is much discussed. The cases of meningococcic septicemia are increasing in number and a few cases of acute meningococcic endocarditis have been reported, to which number Krumbhaar and Cloud²² add three cases. They believe that the finding of meningococci in the petechiæ and elsewhere and the type of initial fever indicate that in many cases the infection is temporarily generalized, and the occasional isolation of meningococci from the blood prior to their detection in the spinal fluid is added proof that the route of entry from the nasopharynx is probably the blood-stream. The meningococcus invades the whole system, but in the majority of cases exerts a selective affinity for the meninges. In a few the septicemic features may persist and overshadow the meningitic element, or even cause death without either clinical or postmortem signs of meningitis.

Krumbhaar and Cloud believe the early occurrence of petechiæ may be a useful indication that a septicemia has been established, and intravenous as well as intrathecal medication is thereby indicated. In the ordinary nonfulminating, nonpetechial type of meningococcus infection the chief route of specific treatment should be intrathecal. The disappearance of meningitic symptoms, with persistence of signs of septicemia, should be an indication to substitute intravenous for intrathecal treatment, although if actual vegetations are present on the valves, it will rarely, if ever, be successful.

The improvement that may sometimes be obtained by the combined

²² Journal of the American Medical Association, December 28, 1918.

method is shown by a case reported by Hoyne, Arkin and Sherman.²³ The diagnosis of epidemic meningitis was positive, the symptoms were very severe, but fifteen days after entering the hospital, the patient was discharged with complete recovery. The total amount of serum given was 115 c.c. intravenously and 95 c.c. intraspinally. These writers believe it is imperative to drain the spinal canal as frequently as the case demands, but not to give serum on each occasion a puncture is made. Through irritation of the meninges by superfluous serum, a turbid fluid with high cell count may result. They think there is no doubt that in many instances the symptoms of epidemic meningitis are prolonged by the continual injection of serum intraspinally far in excess of the amount required to obtain a cure.

Pyocephalus in Epidemic Meningitis. The treatment of pyocephalus, or at least distention of the ventricles by a turbid, if not a purulent fluid, is discussed by Stetten and Roberts.²⁴ The symptoms of this condition as given by these writers are as follows: About the end of the first week of the disease, the spinal symptoms, which have been marked, become less striking, or may even almost entirely disappear. The patient seems to be improving, when suddenly the cerebral symptoms surge into the foreground. The temperature may be irregular, but not infrequently is normal. The pulse becomes relatively slower. The headache becomes more intense, so unbearable that hypnotics in large doses must be given to keep the patient quiet. Vomiting is not infrequent. Convulsions, delirium, loss of consciousness and stupor develop. There is incontinence of urine and feces. The optic disks show choking, and all the signs point to a rapidly increasing intracranial, or intraventricular, pressure. The symptoms are characteristically intermittent. A striking feature of this stage of the disease is the absence of relief by lumbar puncture, and the flow on puncture shows a noticeable fall in pressure, which may have been rather high previously. The fluid may become clear after having been turbid or purulent. Coughing and straining do not increase the flow as before, and the tap may be dry. The usual outcome is a fatal one, and death is more the result of acute increase in intraventricular pressure.

Stetten and Roberts report a case of epidemic meningitis with symptoms of ventricular distention, and relief by puncture of the corpus callosum. The fluid from the ventricles was entirely different in character from the last fluid obtained by lumbar puncture, and the manner in which the fluid gushed from the cannula proved conclusively that the diagnosis of ventricular block was verified. The immediate post-operative improvement in the patient was regarded as almost miraculous and recovery eventually became complete. When there is actual infection of the ventricle, that is, when the ventricular fluid is turbid or purulent, or when diplococci are found in the smear, intraventricular administration of antimeningitic serum should be combined with puncture of the corpus callosum. Care must be observed to inject less serum into the ventricles than the amount of fluid withdrawn.

²³ Journal of the American Medical Association, January 4, 1919, p. 22.

²⁴ Ibid., January 25, 1919, p. 244.

RESIDUALS OF EPIDEMIC CEREBROSPINAL MENINGITIS. This disease often leaves certain serious symptoms behind it and these have been studied by Rosanoff²⁵ at the Plattsburg Barracks. The syndrome he describes is made up of the following elements: (1) Limitation of flexion of the spinal column, (2) undue fatigability, (3) pains in back, legs and head, (4) tendency toward dizziness and faintness, (5) muscular weakness, (6) tendency toward blurring of vision associated with photophobia, (7) impairment of appetite and sleep associated with a state of undernutrition.

The limitation of flexion of the spinal column was shown by inability to stoop over far enough to touch the toes with the tips of the fingers without bending the legs at the knees. Most of Rosanoff's patients could not come within a foot of this. Some of the patients could not come within two inches of touching the sternum with the point of the chin.

Undue fatigability varied much in degree. In some it was very marked, in others it was recognized by comparison with the endurance of the other men.

Pains in the back, legs or head were present in all cases, and in some they were very severe. The favorite locations were the lumbar region, the back of the head and upper part of the neck, the legs behind the knees, and the back between the shoulder blades.

A tendency toward dizziness and faintness was present in almost all the patients, but varied in degree. Stooping, more than other movement, excited this symptom.

Muscular weakness was shown especially by feeble handgrips.

The tendency toward blurring of vision was common but variable in degree. It became manifest when an attempt was made to read. It appeared to be caused by weakness of the ocular muscles.

The impairment of appetite and sleep possibly was secondary to change in mode of life and the association with pain.

Irrigation of Subarachnoid Space. In some cases of intracranial disease it seems as though irrigation of the brain and cord might be advisable, as in this way a toxic spinal fluid could be removed and medicinal treatment applied to a large part of the central nervous system. Alford²⁶ has carried out experiments which show that it is possible to irrigate the subarachnoid space in an animal from one extremity to the other in either direction, from the lateral ventricle to the lumbar region of the spine, and in the cadaver from spine to ventricle; and also that it is possible to employ in these irrigations weak solutions of neutral formalin, boric acid, potassium permanganate, lysol and argyrol, without causing the death of the animal.

In this procedure he thinks we have a method of testing the toxicity and action of drugs in the meningeal spaces which is superior to procedures now in use because it is possible to bring the drug into contact with the entire surface of the nervous system and to maintain it there in a known

²⁵ Journal of the American Medical Association, November 2, 1918, p. 1476.

²⁶ Journal of Nervous and Mental Disease, November, 1918, No. 5, vol. xlvi, p. 359.

concentration for considerable periods of time, and under pressure conditions not greatly different from those of the spinal fluid.

Whether this irrigation can be applied in human therapeutics is a very doubtful question. Judging from the experiments on the cadaver, the mechanical part is entirely possible, but doubt remains as to the ability of the human nervous mechanism to tolerate the solutions under the same conditions as animals. In animals the operation is a difficult one and untoward symptoms frequently develop without warning. If at all applicable it would be in desperate conditions, such as septic, pneumococcus or tuberculous meningitis, for which little can be done otherwise and in which almost any risk is justifiable.

Meningitis in the Newborn. Although unquestionably meningitis is a common disorder, in the opinion of Barron,²⁷ it is exceedingly rare during the early months of infancy. In reviewing the literature he was able to find only 39 cases reported in infants under three months old. Of these 39 cases, 19, including the case Barron reports, were in the newborn. He points out that while the *Bacillus tuberculosis* holds an important place in the etiology of meningitis in later infancy, the *Bacillus coli* is the important organism in the early months of infant life.

Pathogenic strains of *Bacillus coli* may show marked variations in form, in rates of fermentation and in motility. The avenues of infection of the newborn have not been definitely established, but Barron believes infection through the mouth by means of fingers or instruments of the accoucheur must always be borne in mind and proper precautions taken.

It may be that some infections occur in the bathtub through water that has become contaminated. The portals of entry of the bacteria may be either through the external auditory canals, the mucous membrane of the mouth, the Eustachian tubes or the intestinal tract.

He thinks the susceptibility of infants to infection with organisms that are otherwise only slightly pathogenic, may be explained by the feebleness of antibody production during the early months of infancy. The greater resistance of breast-fed infants over the artificially-fed ones is probably due to the compensation of the passive immunization by the breast milk for the active immunization which is still deficient.

Hemorrhage of the Brain of the Newborn. This is not a very rare condition and its late results are familiar to every neurologist and pediatrician. The blood may be in the substance of the brain, in the ventricles, under the dura or pia, at the convexity or base. The cause is probably the pressing against and over one another of the cranial bones with the laceration of the delicate bloodvessels of the meninges.

The symptoms may not be evident immediately after birth. As Brady²⁸ says, the condition of the infant may give no hint of the forming hemorrhage for several hours after birth, but as more and more blood oozes from the torn vein the signs of cerebral pressure result. The distensibility of the sutures and bones of the infant's skull plays an important part in the delay of the appearance of increased intracranial tension.

²⁷ American Journal of the Medical Sciences, September, 1918, p. 358.

²⁸ Journal of the American Medical Association, August 3, 1918, p. 347.

The vagus, vasomotor and respiratory centers all show the irritation. The pulse is strong, full, and at times slow; the skin is a peculiar white color; the respiration shows distinct changes, being superficial and rapid or deep and pauseless. The reflexes are increased, and tonic and clonic contractions of the muscles of the face and extremities, followed by paresis, are usually seen. The often repeated convulsions with stupor, the bulging fontanel and wide gaping sutures are the most striking symptoms.

Brady has seen 9 cases of this condition. Four of the children died in the early days after birth, one having had a craniotomy. Two survived and are typical examples of Little's disease; three were treated by lumbar puncture, two making a complete recovery.

Brady believes it is possible not only to relieve, but even to cure, some cases of meningeal hemorrhage of the newly born by lumbar puncture. It cannot remove a supratentorial hemorrhage of large size. In this type of case craniotomy must be considered.

I have known rapidly developing hydrocephalus after birth to give symptoms suggestive of hemorrhage.

Early Involvement of the Nervous System in Syphilis. It has been a disputed question as to the frequency of implication of the nervous system in early syphilis. Statements bearing on this subject have been conflicting. Fildes, Parnell and Maitland²⁹ examined 624 syphilitic men, of whom the great majority were in the early stages of syphilis and showed no obvious signs of nervous disease. Of these, 18 per cent. showed undoubted signs of an abnormal condition of the central nervous system. The number of abnormal cases is considerably less in their series than in those of some others. This is partly due to the fact that cases which were regarded as doubtful were not included, but if these also are regarded as abnormal the percentage of affected men reaches 30.

Even this figure is not so high as some found in the literature, but statements of the numbers of men affected are without significance unless accompanied by an indication of the stage of the disease. There is a pronounced difference in the incidence of abnormal conditions at different stages of infection. There is a progressive increase of these up to the secondary stage, but a slight decline in the later secondary and tertiary period. In their series, of all men who had been affected more than six months and showed no symptoms, no less than 35 per cent. had abnormal central nervous systems.

Their series was smaller in the number of men affected because it included a large number of men in the first weeks of the disease. The onset of the abnormality may be very early. It was even demonstrable in two cases before the Wassermann reaction had become positive in the serum after infection. The nature of this abnormality they regard as positively a syphilitic meningitis. They found lymphocytes in the cerebrospinal fluid and polymorphonuclear leukocytes in the more pronounced cases. In a large proportion of the abnormal cases the fluid showed a positive Wassermann reaction, and in one case they found *S. pallida*.

²⁹ Brain, parts 3 and 4, vol. xli, p. 255.

There is no evidence that previous arsenical treatment increases either the number or severity of the affected cases.

A feature of their cases was the almost total lack of symptoms. Very few of the men complained of any disability even when the meningitis was acute enough to produce a visible opalescence in the cerebrospinal fluid.

Very few showed any clinical signs of nervous disease detectable by their examination. On the other hand, a considerable proportion of the abnormal cases had lesions of the eyegrounds, which were of slight extent but indicated a commencing retinitis.

A certain number of cases showed affections of the internal ears, but there was no evidence that these were more common than among non-syphilitics or syphilitics with apparently intact nervous systems.

Antisyphilitic treatment had a marked ameliorating action upon these conditions. Some were rapidly reduced to normal, while in the great majority of cases improvement occurred within the period of observation. A few of the cases showed a remarkable resistance to treatment; indeed, the meningitis actually progressed in spite of repeatedly renewed treatment.

Although a negative Wassermann reaction in the serum denotes that an affection of the central nervous system is improbable, it does not exclude it, and in view of the importance of early treatment they recommend that lumbar puncture should never be omitted as a routine practice in the examination of all cases of syphilis.

In another paper in which Fildes, Parnell and Maitland³⁰ report the study of a series of 624 unselected cases of syphilis in all stages of the disease they state they found 18 per cent. had 10 cells or over per cubic centimeter and 12 per cent. had from 5 to 9 cells, inclusive, per cubic centimeter in the cerebrospinal fluid. The first group they regarded as positive for syphilis, the second group as doubtful.

In 80 per cent. of cases which had abnormal cerebrospinal fluid there was no clinical sign nor symptom of nervous disease, although 29 cases had over 100 cells per cubic centimeter, 9 had over 300 cells per cubic centimeter, and 3 had 1000 cells or over per cubic centimeter. Many of the other 20 per cent. had symptoms so slight that they were of uncertain value in pointing one to central nervous system involvement.

Some of the cases of pleocytosis occurred soon after infection before the Wassermann reaction in the serum became positive. The incidence of abnormality increased as the disease progressed. In cases of the so-called late secondary period, 29 per cent. had 10 cells or over per cubic centimeter, and 12 per cent. had from 5 to 9 cells per cubic centimeter in the cerebrospinal fluid.

In cases having no active signs of syphilis over six months from infection, 35 per cent. had 10 cells or over per cubic centimeter in the cerebrospinal fluid and 12 per cent. had from 5 to 9 cells per cubic centimeter; 22 per cent. of these had a positive Wassermann reaction in the cerebrospinal fluid. It was possible to detect slight but definite early changes in the eyegrounds of many of the positive cases in this series.

³⁰ Archives of Neurology and Psychiatry, No. 2, vol. i, p. 231.

A negative Wassermann reaction in the serum they found did not in every instance exclude the possibility that there was active syphilitic disease of the central nervous system.

Previous treatment had no effect on the number nor on the severity of the abnormalities in their series.

Intravenous treatment with arsenical preparations restored some of their patients to normal condition; in nearly all it had a beneficial effect, but in a few cases the pathological processes in the central nervous system were not checked even by repeated courses of treatment.

Argyll-Robertson Pupil. CAUSES. The occurrence of reflex rigidity of the pupil in conditions not syphilitic has been the subject of discussion for many years. The sign is an important one, and when it is observed without other signs of disease, it means much to say that it points unmistakably to syphilis, and that the individual is likely to develop either tabes or paresis. It therefore behooves us to acquire all the facts possible before we assume so radical a position, especially as it is known that there are those to whom a reflex rigidity of the pupil invariably means syphilis.

Bumke has stated his conviction after the examination of several thousand pupils that a reflex rigidity of the pupil never occurs except in tabes, paresis or some form of syphilis, and has asserted that no case can be found in the literature in which this phenomenon existed and syphilis could be excluded.

Nonne has reported 2 cases in which the condition could be attributed to alcohol, and I have referred to his work in my paper in *PROGRESSIVE MEDICINE* in 1915. Similar cases have been recorded by Mees, Biermann and Westphal.

W. Mayer³¹ now contributes to the literature on this subject a case long observed by Nissl in which modern methods failed to give evidence of syphilis. Alcohol and diabetes had no etiological value and a cause could not be found. The man asserted that he had had unequal pupils since youth. Mayer suggests that the phenomenon may result from optic neuritis of unknown cause.

UNILATERAL ARGYLL-ROBERTSON PUPIL. It is well known that this phenomenon may be unilateral, but that such cases are rare, especially when there is no other associated oculomotor paralysis, as asserted by Hermann Krueger,³² we may accept as correct. This writer reports three cases in which the condition existed without important impairment of convergence reaction, without trauma and without any other oculomotor defect. In all 3 cases modern methods failed to disclose syphilis. The author discusses theories in explanation, but any conclusion from his cases is more or less uncertain.

Syphilis of the Nervous System. **PITUITARY FORM OF CONGENITAL SYPHILIS.** While acquired syphilis with symptoms pointing to the pituitary body is recognized, the cases of congenital syphilis with this symptom-complex are rare. Nonne³³ was able to refer to three authors who reported cases of this character, and he himself had 3 cases under

³¹ *Neurologisches Centralblatt*, April 16, 1918, p. 274.

³² *Ibid.*, April 16, 1918, p. 276.

³³ *Ibid.*, March 15, 1918, p. 194.

his observation in which dystrophia adiposogenitalis with infantilismus occurred in congenital syphilis. Two of these cases could not be followed, but the third case was one of hereditary lues in the third generation. The patient, a young man, was treated with iodide of mercury and pituitary tablets. After three months the adiposity and feminine type began to disappear, and after six months the appearance was that of a normal young man. The treatment in this case was directed to the syphilis and to the pituitary gland and the result was a very happy one.

CARDIOVASCULAR DISEASE AND SYPHILIS OF THE NERVOUS SYSTEM. Friedman³⁴ has found that among 125 cases of syphilis of the central nervous system, there were 19 cases of cardiovascular disease—an incidence of 14 per cent. Of these, 13 showed disease of the aortic valve either alone or in combination with aneurysm or dilatation of the aortic arch. There were 2 cases of myocardial degeneration with resulting decompensation. Two showed typical aneurysms without demonstrable disease of the aortic valve. In the series was one carotid aneurysm. From these observations and others in the literature the author argues on the associated incidence of syphilis of the central nervous system and cardiovascular syphilis.

LEUKOPLAKIA AS A SIGN OF SYPHILIS. Very often the laboratory findings in cases of suspected syphilis are negative, and although we may suspect that the symptoms of nervous disease in a given case are those of syphilis we have no means often of proving the correctness of our conviction. Pándy³⁵ helps in that he emphasizes the importance of leukoplakia of the mucous membrane of the mouth in this connection. He has studied this condition for ten years and regards it as the most reliable indication of previous syphilis; it always, in his opinion, means syphilis, and he quotes Guszman as stating that it is comparable with tabes, paresis and luetic arthritis as a late syphilitic sign. Leukoplakia occurs frequently, and Fournier has found it often in tabes and paresis. Guszman found it in 45 per cent. of the cases of paresis he investigated, and Pándy's figures are still higher; of 100 males with paresis, 62 had the sign; and of 40 females with paresis, 20 had it.

INTRASPINAL TREATMENT OF SYPHILIS. I have referred in the past to the opposition of B. Sachs³⁶ to this form of treatment in syphilis. He now returns to the same subject, and states that British authors, among them Halliburton, have abandoned the use of arsphenamin in tabes and similar late syphilitic affections *via* the cerebrospinal fluid because they assert it is fatal not only to the syphilitic organism but also to the patient. Swift concedes that he never contended that intraspinal treatment alone was the best or the ideal treatment of syphilis of the nervous system.

Sachs has become convinced of the value of intensive treatment, especially in the earlier and remediable stages of cerebral and spinal syphilitic disease. He has obtained most satisfactory results from intravenous injections administered on alternate days for a period of three to four weeks according to the symptoms presented by the patient,

³⁴ Archives of Neurology and Psychiatry, No. 3, vol. i, p. 289.

³⁵ Neurologisches Centralblatt, January 16, 1918, p. 66.

³⁶ Archives of Neurology and Psychiatry, No. 3, vol. i, p. 277.

and then allowing a period of complete rest or giving weekly or semi-weekly injections of salicylate of mercury for a period of four to six weeks, and then again starting in with the same course of arsphenamin injections. Some of his patients have received as many as forty or fifty intravenous injections within a period of a year or eighteen months. This is a more intensive treatment than most physicians have been willing to employ.

ARSENIC IN THE CEREBROSPINAL FLUID. Whether or not arsenic passes into the cerebrospinal fluid when given intravenously has been much argued. Rieger and Solomon,³⁷ found that of 123 cerebrospinal fluids collected at intervals ranging from five minutes to twenty-three hours after intravenous injection of from 0.3 to 0.6 gm. of arsphenamin, 38 showed appreciable amounts of arsenic.

The largest amount found was 0.6 mg. of arsenous oxide in 1.0 c.c. The average amount was 0.18 mg. per cubic centimeter. The shortest interval at which arsenic was found was thirty minutes; the longest two hours.

With successive injections, the fluids in general show progressively smaller amounts of arsenic for the same time interval.

In general, those patients consistently showing the larger amount of arsenic in their fluids made the more rapid improvement.

Rieger and Solomon suggest that intravenous injections of divided doses at one- or two-hour intervals would prove more effective in maintaining a high concentration of arsphenamin in the blood for longer periods, and thus possibly allow increasingly greater amounts to pass into the perivascular spaces.

Sachs' paper, published in 1917, discrediting the intraspinal injections of arsenic is answered by Cummer and Dexter³⁸ who report their experience of five years' duration. They believe that arsphenaminized serum properly employed is not in any sense dangerous. Excellent evidence of its efficacy is offered by the patients, who repeatedly endure the painful though harmless reactions which frequently follow intraspinal injections.

They acknowledge that little or nothing can be expected from this treatment in fully developed paresis, but much advantage is derived in many cases of tabes dorsalis and syphilitic meningitis when other methods have proved inefficient.

The results of the laboratory examinations of the blood and especially of the spinal fluid must be considered as an integral part of the clinical picture, both in the diagnosis and in the direction of treatment.

The method they regard as a distinct addition to our therapeutic armamentarium.

B. A. Thomas³⁹ has employed the intraspinal injection of auto-arsphenaminized serum in the treatment of cerebrospinal syphilis over four and a half years. The technic employed has been essentially that of Swift and Ellis.

He concludes that although many patients, even tabetics, respond to

³⁷ *Journal of the American Medical Association*, July 6, 1918, p. 15.

³⁸ *Ibid.*, September 7, 1918, p. 788.

³⁹ *Pennsylvania Medical Journal*, March, 1919, p. 377.

general or intravenous treatment, the accessory employment of intraspinal treatment accelerates the restoration of the spinal fluid to normal, arrests the degenerative process and insures greater permanency of therapeutic results.

Intraspinal treatment by auto-arsphenaminized or arsphenaminized auto-arsphenaminized serum injections should supplement intensive intravenous therapy only when necessary.

Treatment in qualified cases should be continued until the findings in the spinal fluid, as well as in the blood, are rendered negative, excepting globulins, which may persist positive in many cases irrespective of the treatment.

Mercury and the iodides continue to be indispensable supplementary therapeutic agents in the treatment of cerebrospinal syphilis.

Spina Bifida Occulta in the Cervical Region. It seems hardly probable that many physicians have observed spinal bifida high in the spinal column although it is not an uncommon finding at the lower end of this structure. In 385 cases in which operation had been performed, Moore found only 9.5 per cent. occurring in the cervical region. As Clark⁴⁰ states, it has been estimated that of all varieties in all regions, the occult comprises only 5 per cent. In the case he reports, on the posterior surface of the neck in the median line between the fourth and fifth cervical spines was found a depression in the skin about an eighth of an inch in depth, out of which a small tuft of hair half an inch in length was growing. A skiagraph showed no defect in the fourth or fifth cervical vertebra but a cleft in the arch of the third. There was a peripheral distribution of motor disturbance, segmental in type, corresponding approximately to the seventh and eighth cervical and the first thoracic roots. An attempt to correlate the peripheral disturbance with the defect in development of the third cervical vertebra was not possible, but there need be no direct relationship between the vertebral cleft and the peripheral disturbance. The cleft showed evidence of a general tendency to failure of development in this region, and Clark thought the actual lesion in the cord might be caused by a defect in the region of the lower cervical vertebræ not visible in the x-ray photograph.

Etiological Relation of Tuberculosis to Progressive Spinal Muscular Atrophy. The causes of progressive bulbar palsy and progressive spinal muscular atrophy are obscure; it may indeed be said truthfully that we do not know why either of these disorders develops. It is by no means certain that either is produced by infectious disease, but all attempts to find the etiology should be welcomed. Recently, Hermann Eichhorst⁴¹ has written on the etiological relation of tuberculosis to progressive spinal muscular atrophy. Such a relationship has not been entertained by others, although it is generally recognized that tuberculosis may be a cause of multiple sclerosis. Eichhorst refers only to Oppenheim and to Giraud and Gneid, but, in reading the description given by the former, one gets the impression that he is referring to a condition of pressure on the

⁴⁰ Journal of Nervous and Mental Disease, September, 1918, No. 3, vol. xlviii, p. 201.

⁴¹ Deutsches Archiv f. klinische Medizin, Nos. 3 and 4, vol. cxxvii, p. 161.

spinal roots and spinal cord from carious vertebræ. The latter describes muscular atrophy in a tuberculous person who was also syphilitic.

Eichhorst's patient had pulmonary tuberculosis, tuberculous caries of the cervical vertebræ and progressive spinal muscular atrophy, and the atrophy was typically of the spinal form, as shown by the microscopic examination. Eichhorst attributes the cord disease to the carious vertebræ, but there is nothing in his paper which establishes this relation. The atrophy occurred in a tuberculous man, but it is not proved that it occurred because of the tuberculosis, and more than one case will be needed before we can accept tuberculosis as a cause of progressive spinal muscular atrophy. Eichhorst's paper, however, will attract attention to this subject.

Familial Progressive Muscular Atrophy in Adults. The muscular atrophies have for a long time been carefully studied and considerable order has been brought out of the chaos existing originally in their classification. It has not always been easy to separate the spinal forms from those in which the muscles alone are affected. Heredity has not been a striking feature in the spinal form occurring in adults. Hamilton⁴² has reviewed the literature on this subject and made a contribution to it of his own, and he shows there are few satisfactory cases belonging to this type, and even those he accepts show much diversity. The atrophy has begun in different parts of the body, and even in the same family the area involved in different individuals is not necessarily the same, contrary to Jendrassik's statement of the absolute similarity of the phenomena in different members of the same family affected with a familial nervous disease. There is a decided difference in the age of onset in the different families and in different members of the same family.

There have been sensory disturbances in some of the cases. The duration of the illness has varied from a few months to several years. Fibrillary tremor has been frequent but not always present. Hamilton accepts the view that the types of slight variation in muscular atrophy really represent a unified process in the nervous system, whose varying symptoms are determined solely by the extent of the lesion. There are groups less frequently observed which serve as intermediary forms connecting the better-known types. This view seems to me the proper one.

Labor in Paraplegic Women. It is known that labor may occur in a pregnant woman provided the lesion is not low in the spinal cord. Drummond Robinson⁴³ reports a case of transverse myelitis of the cord in the thoracic region of a pregnant woman in whom the uterus increased in size abnormally slowly after the fifth month, and at full term was only as large as an ordinary seven-months' uterus. Labor took place 281 days from the cessation of the last menstrual period, and was painless, but otherwise entirely normal. Involution and lactation were normal. Robinson says that in 1897 Amand Routh read a paper in which he gave notes of seven similar cases together with notes of a case of his own, and since then there has been no other similar case recorded.

⁴² *Journal of Nervous and Mental Disease*, August, 1918, No. 2, vol. xlviii, p. 127.

⁴³ *Lancet*, December 21, 1918, p. 848.

Probably this number of cases could be increased. I recall distinctly a case of spastic paraplegia in a pregnant woman seen by me approximately fifteen years ago, in whom evidently a transverse lesion above the lumbar cord existed. Labor was painless but not otherwise abnormal.

Multiple Sclerosis with Paralysis of the Cervical Sympathetic. Three cases of this disease with myosis, ptosis and enophthalmus are recorded by Tibor,⁴⁴ and the paralysis of the cervical sympathetic was attributed to a sclerotic focus in the ciliospinal center. As the cervical sympathetic fibers leave the cord at the eighth cervical and first thoracic segments, a lesion here could easily cause paralysis of these fibers; the condition, however, seldom occurs.

Bastian's Law. The observations of Bastian⁴⁵ led to the conclusion that a complete transverse lesion above the lumbar region produced flaccid paralysis of the lower limbs and loss of reflex. Numerous cases have shown that this law has exceptions, and one of the most interesting cases has been reported recently by Schaller.

A man had a complete division of the spinal cord, as shown by operation, and although an attempt was made to suture the cord it was not possible to approximate the two ends within less than one-half inch. The injury was at the level of the tenth thoracic vertebra. It occurred October 12, 1915, and the man was still alive in September, 1918. He had exaggerated patellar and Achilles reflexes, patellar clonus, automatic action of the bladder and rectum, and preserved muscle tonus of normal or increased degree. There can be no doubt as to the presence, therefore, in this case of normal or increased muscular tonicity with exaggerated tendon reflexes with complete supralumbar division of the spinal cord.

Recurrence of Poliomyelitis. There can be no doubt that one attack of poliomyelitis almost invariably gives immunity, and yet occasionally this rule seems to fail. Fortunately, the acceptable cases of recurrence are very rare. Francis and Moncreiff⁴⁶ refer to the work of Flexner, Rosenau and others who have succeeded in producing an antipoliomyelitic serum or antibody by means of which they have been able to protect the ape against experimental inoculation with the active virus. The experimental evidence thus tends very definitely to show that the virus of poliomyelitis is specific, that it produces specific antibodies, and that an attack of the disease is followed by a lasting immunity, as occurs in the case of the other specific infectious diseases.

Francis and Moncreiff refer to Wickman's statement that in a few instances the course of the disease has been marked by one or more relapses or exacerbations of the infection, these occurring usually within a few days or weeks of the original onset, or very rarely within a few months. The interval between such relapses is usually afebrile, and nearly always marked by partial resolution of the initial paralysis. The literature contains fourteen instances in which it would seem that the disease has followed a course of this type. They state there are but eight instances reported in which a second attack of poliomyelitis has

⁴⁴ *Neurologisches Centralblatt*, August 1, 1918, p. 515.

⁴⁵ *Archives of Neurology and Psychiatry*, No. 1, vol. i, p. 77.

⁴⁶ *Journal of Nervous and Mental Disease*, April, 1919, No. 4, vol. xlix, p. 273.

occurred after an interval longer than four months following the onset of the first attack, and in two of these cases the nature of the subsequent attacks seems very doubtful. They report a case in which two separate attacks of poliomyelitis occurred with an interval of fifteen years of health. A girl at the age of three years had an attack with paralysis of both upper extremities and transient weakness of both lower extremities. After improvement, a residual palsy persisted. When eighteen years old she had the second attack, in which the lower extremities became paralyzed.

Acute Polyneuritis with Fever. This little-known form of multiple neuritis, described by Holmes,⁴⁷ has been observed also by German neurologists. Kurt Singer, under the title of mononeuritis multiplex infectiosa, describes a case in which the symptoms began in the field with chill, fever, enlargement of the spleen, pain in the joints and pyelonephritis. Then pain developed in the brachial plexus with increase of the upper limb weakness. The name was given because of the decidedly greater implication of certain nerves of the brachial plexus, and not exactly the same nerves on the two sides.

Kurt Mendel⁴⁸ describes a case occurring in a soldier who previous to the onset of the neuritis had been healthy, and had had no contact with any poison. The symptoms began suddenly while he was in the field with fever, vomiting, headache, diplopia, pains and weakness in both lower limbs, especially the left, and later there were paralysis and pains in the left upper limb and shoulder. Five weeks after the onset of the disease the clinical picture consisted of weakness of the entire left facial nerve; weakness, atrophy and hypotonicity in the left upper limb and left shoulder region, with impairment of the triceps and infraspinatus reflexes and greater implication of the triceps, deltoid and trapezius muscles, which showed in parts complete reaction of degeneration and in other parts partial reaction; and tenderness to pressure of the nerves of the left upper and lower limbs, with integrity of the cutaneous sensation.

Here also there was a selective action on the muscles justifying the name mononeuritis multiplex. Evidently the cause was some unknown infection. Whereas in Holmes' cases the lower limbs were the most seriously attacked, in Mendel's case the weakness of the lower limbs diminished rapidly and the neuritis became localized to the left shoulder and upper arm.

Poliomyelitis, as Mendel points out, gives a picture very much like this, and the differential features he mentions are not very reliable, as he also acknowledges. Indeed he goes so far as to assume that in his case there was a mild involvement of the cells of the anterior horns of the spinal cord, either primary or secondary, with the much greater disease of the peripheral nerves.

Multiple Neuritis from Binitrotoluene. The effects on the human system of poisoning in the manufacture of explosives are only partially

⁴⁷ British Medical Journal, July 14, 1917.

⁴⁸ Neurologisches Centralblatt, April 16, 1918, p. 281.

understood. Hamilton and Nixon⁴⁹ have studied a case in which they believed optic atrophy and multiple neuritis resulted from binitrotoluene, the product of the second step in the nitration of toluene. Inasmuch as the deep reflexes of the lower extremities were not markedly diminished they believed that the lateral columns of the cord were affected. In the plant where this man worked whom they studied there were two cases of pronounced mental aberration and one of somnolence. In the mental cases no delusions or hallucinations were manifested, but the condition was one of mental dulness.

The Treatment of Tic Douloureux with Trichlorethylene. Plessner⁵⁰ found in treating 4 cases of trichlorethylene poisoning that the sensory trigeminal nerve alone was paralyzed; the motor branch, the adjoining spinal nerves and the vagus escaped. The substance had a peculiar affinity for this one nerve. It occurred to him that if toxic doses destroyed the sensation in the parts supplied by this nerve, medicinal doses might diminish the pain of tic douloureux and even produce a cure. The poisoning had been produced by inhalation during a half day or one day, and the anesthesia of the trigeminus had persisted for a month. All who had been exposed to the fumes had not been affected by them, so that a predisposition seemed to exist. He began the treatment by inhalation of 3, 5 or 8 drops. The first cases treated in this way reacted promptly, but larger doses were needed for other cases, and 30, 40, and indeed 60 drops were tolerated without complications. He obtained none of the manifestations of poisoning. The inhalations were repeated frequently, and recovery occurred in all his cases except two, and these two were still under treatment. The effect was rapid in some instances, even within a few days; slow in others. Men reacted more promptly and more successfully than women, possibly because they belonged to the laboring class and used alcohol. Severe cases and those of long duration were more difficult to treat than mild cases. He treated in all 17 cases. The inhalations caused a brief vertigo in some feeble persons.

Diabetes Insipidus with Abducens Paralysis. Mendel's⁵¹ attempt to make a definite symptom-complex consisting of these two disturbances, without any other ocular palsy, is interesting. In his patient other symptoms were myosis, slow and limited reaction of the pupil, and weak patellar reflexes. A history of syphilis was obtained, the Wassermann reaction was positive, and the diagnosis of tabes was made. Later study of the case led to a diagnosis of syphilis in the region of the pituitary body, and reference is made to the work of Oppenheim and Kahlmeter by which it was shown that pituitary disease might simulate tabes or paresis.

Mendel refers to 5 cases in the literature in which diabetes insipidus occurred with abducent palsy without implication of any other cranial nerve, and he assigns the lesion to the interpeduncular space. A lesion situated a little further forward would cause implication also of the troch-

⁴⁹ Journal of the American Medical Association, June 29, 1918, p. 2004.

⁵⁰ Monatsschrift f. Psychiatrie und Neurologie, December, 1918, No. 6, vol. xlv, p 374.

⁵¹ Neurologisches Centralblatt, April 16, 1918, p. 285.

lear and oculomotor nerves, and where other causes fail, as trauma, syphilis must be suspected in the form of a meningitis.

A case of this type with which Mendel evidently is not familiar was reported by Lloyd⁵² as remotely as 1897. A young man clearly syphilitic had intense polyuria with complete paralysis of the right abducens nerve and slight drooping of the right side of the face, although it is not stated there was any facial palsy. No other cranial nerve was affected unless possibly there was some impairment of hearing. About three months after admission to the hospital the paralysis of the abducens nerve entirely disappeared, and was replaced still later by a paralysis of the oculomotor nerve.

Paralysis of the Sixth Cranial Nerve Associated with Otitis Media. It is interesting and important to understand why the abducens nerve occasionally is paralyzed in association with otitis media, and this complex with persistent pain in the frontal, temporal and parietal regions is known by the name of Gradenigo, who first described it. The pain is attributed to the implication of the trigeminus, and according to John M. Wheeler,⁵³ who writes a very interesting paper on this subject, the muscles of mastication supplied by the inferior maxillary branch of the trigeminus may show contractions or paralyses. He goes into a very interesting description of the anatomy of the parts concerned in the syndrome. The abducens nerve passes forward in contact with the dura which covers the basilar surface of the sphenoid bone. It enters the cavernous sinus well below the posterior clinoid process and a little below the level of the tip of the petrous portion of the temporal bone, and passes forward through the whole length of the cavernous sinus, then through the sphenoidal fissure in its lower, nasal part near the ophthalmic vein, thus entering the orbit. The course of the sixth nerve in the cavernous sinus is different from that of the third and fourth nerves in the length of its course and in its position. The sixth nerve enters at the posterior wall and passes forward through the blood of the sinus supported by a delicate meshwork of fibrillated fascial tissue and sympathetic nerves, and lies in contact with the internal carotid artery, between it and the outer wall of the cavernous sinus. The third and fourth nerves enter the sinus considerably further forward than the sixth, and lie in contact with the external wall in the anterior part of the sinus only, and thus are less within the sinus both as to length of course and as to position. The important intimacy with the blood-stream of the cavernous sinus, Wheeler believes probably accounts for the special vulnerability of the sixth nerve to sinus infection, toxemias from many forms of infection, and the many cases of sixth nerve paralysis from spinal anesthesia. This explanation really does explain certain conditions which have been difficult to understand and therefore it has seemed sufficiently important to me to refer to Wheeler's description of the anatomy, but he goes further.

* Diseases of the Cerebrospinal and Sympathetic Nerves, Twentieth Century Practice.

* Journal of the American Medical Association, September 23, 1919, No. 21, vol. lxxi, p. 1718.

The abducens nerve pierces the dura and for a distance of 2 or 3 mm. is enclosed by a covering of areolar connective tissue which resembles superficial fascia. Just in front of this the nerve trunk is found in contact with the periosteum at or near the apex of the petrous pyramid of the temporal bone, at which point it enters the cavernous sinus, usually just external to the junction of the inferior petrosal and cavernous sinuses. The small area of contact of the abducens with the petrous bone at or near its tip is marked by a little groove, and just external to and behind the groove is a little spicule of bone; and on the border of the dorsum sellæ of the sphenoid is another spicule. Between these two spicules of bone, and stretching closely over the sixth nerve, is a firm ligament, which sometimes undergoes partial or complete ossification, and to this ligament is attached the dura and fascial connective-tissue layer which the abducens penetrates. At this point the anatomic arrangement is such that exudate or hemorrhage from an inflammatory process or from traumatism, or edema from any cause, would be likely to interfere with the function of the abducens by pressure or strangulation.

The Gasserian ganglion lies close to the sixth nerve, so that a process which would affect the sixth nerve at the tip would be likely also to affect the Gasserian ganglion.

In ordinary otitis media it is possible for the inflammatory process to extend to the apex of the petrous bone and to produce an edema or a local toxemia which will cripple the function of the sixth nerve at the vulnerable point. Occasionally the petrous bone is very pneumatic, and it is in such a bone that the purulent process would be most likely to invade the pyramid to the apex. There may be a large air cell directly under the groove for the lodgment of the sixth nerve.

In operation in mastoid disease when the bone is very hard the vigorous use of the mallet may disturb the tissues at the apex of the petrous pyramid in such a way as to produce hemorrhage or edema that would result in pressure paralysis of the sixth nerve at this vulnerable point and produce an abducens palsy following the operation.

The paralysis may clear up in a few days, and in a few cases has disappeared promptly after mastoid operation, but usually it persists for weeks or months, and may be permanent.

Tinel's Sign in Peripheral Nerve Lesions. Much has been learned regarding the treatment of nerve injuries but certain questions have not been definitely answered and differences of opinion still exist. Macdonald⁵⁴ says two aphorisms appear to have a wide vogue in England at the present time—namely, (1) that an electrical examination of one kind or another is in itself the best, if not the only, criterion of the physiological continuity of a nerve, and (2) that when the reaction of degeneration is found to be present at several examinations conducted within a brief space of time, or when there is much pain in the course or territory of a wounded nerve, it is the duty of the surgeon to explore. Macdonald thinks there are two serious objections to early operation—the risk of

⁵⁴ British Medical Journal, July 6, 1918, p. 6.

injuring muscular branches which are intact, and the danger of damaging a nerve trunk in process of natural recovery. Of all the lessons that this war has taught us in neurology, there is none so striking as that of the tendency to natural recovery in nerves which have been concussed, contused, compressed, lacerated, or even divided, and this recovery may begin to assert itself as late as ten or twelve weeks, or even longer, after the injury. Nerve tissue which is in the act of regeneration or recovery is specially susceptible to mechanical injury and it is impossible to avoid some degree of this in the investigation of a nerve in a healed gunshot wound. Even when the surgeon scrupulously avoids touching the nerve with his instruments, the disturbance of the blood supply, of the sympathetic fibers, and of the *nervi nervorum* must cause considerable interference with function.

Dejerine stated that the electrical reaction of muscles supplied by a wounded nerve are not in themselves a guide as to the nature of the lesion, nor are they a measure of its severity. Macdonald says that muscles supplied by nerves which are the subject of perineural or neuritic irritation sometimes show marked atrophy and reaction of degeneration even when they have not quite lost the power of voluntary contraction. Secondly, nerves which have been severely contused or compressed but which have no anatomical solution of continuity may show reactions of degeneration. In the third place, the reaction of degeneration does not always follow the section of a nerve. He has seen complete division of the musculospiral nerve but the extensors of the wrist responded well to faradism, and all the extensors gave a brisk galvanic response. He warns that electrical tests are of great assistance in arriving at a complete conclusion when taken in conjunction with other methods of examination, but they should not be regarded as final, and it is important that the other methods of diagnosing the interruption of a nerve should have their true value recognized.

Of these the most important is Tinel's *signe du fourmillement*, which Macdonald translates as distal tingling on percussion (and abbreviated as D. T. P.). This sign depends on the fact that when young axis cylinders are percussed there is a sensation of tingling in the cutaneous area corresponding to the ultimate distribution of the axis cylinders. In four to six weeks after section of the musculospiral nerve new bundles of axis cylinders will be at the lower end of the proximal segment. If they are firmly tapped with the forefinger the patient will experience a sensation of tingling in the skin over the dorsum of the first and second metacarpals. When tingling in the hand follows tapping on the arm this does not indicate continuity of the neurone between the arm and the hand but between the arm and the brain. If the new axis cylinders are arrested or twisted back to form a neuroma by a fibrosis or keloid mass at the end of the lower segment, or if they cannot reach the latter owing to extensive destruction, the portion of nerve from which D. T. P. can be elicited is never longer than 2 or 3 cm., and is situated at the site of the lesion.

If the new axis cylinders succeed in growing down the trunk, or if the latter has only been contused and has preserved its anatomical con-

tinuity, then *pari passu* with the growth of the cylinders there occurs a downward extension of the D. T. P. In young healthy subjects this growth takes place at the rate of 1 or 2 mm. a day, and, in cases in which regeneration is occurring, the growth of the new cylinders may be regularly followed down the limb by this simple test. When the new axis cylinders have completely developed their function, the D. T. P. disappears. This usually occurs in about 100 days, so that when the cylinders have travelled about 10 cm. down the nerve trunk the site of the lesion is beginning to lose its D. T. P. In nerves which are regenerating one will always find an area some 10 cm. long where D. T. P. can be elicited, and this area travels gradually down the nerve until it reaches the lower end and finally disappears. In a sciatic lesion, for example from a wound in the buttock, where regeneration is taking place, at the end of twelve months there will be paralysis, atrophy, and reaction of degeneration in the leg muscles. But if an area of D. T. P. some 10 cm. long is found above the level of the popliteal space, a good prognosis can be given and a needless operation avoided. As this sign always precedes the return of muscular tonus, voluntary movement and normal electrical reactions by a considerable interval, it will be seen to be an indication of great value after operation for nerve graft or suture.

D. T. P. is also found in neuritis but then it can be elicited along the whole length of the irritated nerve, and further, the percussion causes pain and tingling at the point percussed. This form of D. T. P. is easily distinguished from that caused by regeneration.

In testing for D. T. P., percussion must always be begun from the distal end and proceeded slowly, as an unintelligent patient may have a persistent sensation of tingling once it has been obtained and so give fallacious responses. Too much shaking of the limb must be avoided, as in a sensitive patient the shock may set up tingling in an area other than the one percussed. Care must be taken not to set up tingling in another nerve. Another source of confusion is the downward growth of stray fibers while the bulk of the nerve remains interrupted. This error can be rectified by later examinations when the bulk of the D. T. P. is found to be at the site of the lesion, while that obtained lower down is indistinct and irregular.

The complete absence of D. T. P. is usually a sign of grave import, but it is of more value as a positive than as a negative sign.

It is only fair to state that some observers are not enthusiastic over this sign of D. T. P.

The time at which operation should be done is very important and varies with the operator. Macdonald states that on the Continent there is a growing tendency to restrict operation to those cases in which resection and suture are required. Delagenière, whose results in nerve surgery are unsurpassed, writing of cases whose after-progress had been studied for two years and a half, states that 113 cases in which liberation of the nerve was practiced did not on the whole seem to do any better than cases which were left alone. Falcone concluded it was better as a rule to postpone operation so as not to run the risk of cutting unaltered fibers and damaging those which were in process of regeneration. He

considers that the most favorable time for operation is the fifth or sixth month. Delangeni re usually does not operate before the end of the third month. Macdonald says these opinions are borne out in his experience. The question of pain is one of great importance. Early operation for pain is advisable and may take the form of arterial decortication (Leriche), catgut ligature of the nerve above the lesion (Lortat-Jacob and Haliez), distal section and immediate suture of the nerve (Tinel and Delageni re), or injection into the nerve of 65 per cent. alcohol (Sicard). Leriche's operation is extensive and tedious, but sometimes gives good results. Macdonald says he has always succeeded with alcohol injections. The experience of Lieut.-Colonel Acland and Major Stout has shown that 65 per cent. alcohol is more effective than 60 per cent. in calming the pain and does not paralyze the motor fibers. Tinel claims that section and immediate suture of the nerve at the wrist or ankle is always successful, but Macdonald has seen it fail in one case, as also, in another, the distal injection of alcohol. In a very acute case of musculospiral causalgia, proximal injection of alcohol was immediately successful.

This paper by Macdonald is so important and concise and contains so rich an experience that I have drawn on it freely.

Peripheral Nerve Injuries. Price, Feiss and Terhune⁵⁵ have had much experience in injuries of nerves at the American Red Cross Military Hospital No. 1 and have found that:

1. The musculospiral is the nerve most frequently injured in war; the ulnar nerve is involved nearly as often.

2. Following operation the musculospiral and sciatic nerves make the best recoveries, the results in the case of the sciatic being equally as good as those of the musculospiral.

3. The condition of an injured nerve when examined by sight and touch at the time of operation, is invariably worse than the previous clinical findings would lead one to expect.

4. When, at the time of operation, having utilized all the methods to determine whether simple liberation or excision and suture is the best procedure, if doubt still exists, excise and suture.

5. Repair of an injured nerve as early as possible should be the aim of every surgeon. For this reason in time of war neurologists should be stationed close to the front, in order that the wounded may be examined for nerve lesions before going to the operating room. This, by increasing the number of primary nerve sutures, will unquestionably lead to a higher percentage of recoveries.

6. Patients recovering from nerve reparation should be encouraged to use the extremity affected, for volitional effort plays a part in the return of function.

7. The more respect the surgeon shows nerve tissue when repairing an injury the better will be his results. The nerve should be stripped and handled as little as possible, and the ends should be so approximated as to place in apposition corresponding fasciculi of the cut nerve.

⁵⁵ Archives of Neurology and Psychiatry, May 1, 1919, No. 5, vol. i, p. 547.

EDEMA AS THE ONLY SIGN OF NERVE INJURY. We expect an injury of a nerve to produce paralysis of motion or sensation or of both, but it is not generally known that the only sign of such an injury may be edema. Hauptmann⁵⁶ reports a case in which striking the left elbow in falling down the steps produced only edema of the third, fourth and fifth fingers and the adjoining part of the hand, *i. e.*, in the distribution of the ulnar nerve. There was no weakness and at first no sensory disturbance of the hand, so the edema could not be attributed to fixation of the hand, and must be attributed to a lesion of the sympathetic fibers in the nerve. After twenty-four hours the edema was more pronounced and slight diminution of tactile sensation was detected, but the latter disappeared within another twenty-four hours although the edema persisted in less intensity, and the slight sensory disturbance was evidently caused by the pressure of the edema. The chief interest of the case lies in the demonstration it presents that only the sympathetic fibers of a nerve may be paralyzed, but it offers no explanation why just these fibers were attacked.

Contracture after Facial Palsy.⁵⁷ When recovery from peripheral facial palsy is only partial a tic movement about the mouth on the paralyzed side is very common. This never occurs when the paralysis remains complete or when recovery is complete or nearly complete, it is therefore necessary that the recovery should be partial when these involuntary movements occur. If one observes carefully he will find that this jerking of the corner of the mouth is always synchronous with the closure of the lids on the same side in winking; it is therefore an associated movement. The explanation of this phenomenon is that when regeneration occurs, and young axis cylinders grow out from the central trunk, some of these intended for the upper branch lose their way and grow into the lower branch, while others intended for the lower branch find their way into the upper branch; thus the cells of the facial nucleus originally intended for the innervation of only one branch of the nerve are brought into control of both branches, and no movement occurs alone in one branch. The person in such a condition draws up the corner of the mouth every time he closes the eye, or he partially closes the eye on the same side every time he draws up the corner of the mouth, so that the facial tic in the muscles about the mouth is nothing more than an associated movement.

Muscular contracture of the face is frequently associated with this involuntary jerking and occurs under the same conditions; it must therefore have the same cause. To me it seems reasonable to seek this cause in overstimulation of the affected muscles. Every time the eyelids are closed the corner of the mouth on the affected side is drawn up, and the muscles of this part receive a stimulation to this extent greater than occurs in a normal person. Likewise, every time the mouth is moved, as in chewing and speaking, the muscles innervated by the upper branches are stimulated and the lids on the affected side are partially closed, thus the orbicularis palpebrarum is stimulated frequently in addition to that

⁵⁶ Neurologisches Centralblatt, March 15, 1918, p. 197.

⁵⁷ Archives of Neurology and Psychiatry, May 1, 1919, No. 5, vol. i, p. 564.

caused by normal winking. The muscles on the affected side, as a result of this excessive stimulation, are kept in a state of hypertonicity, and complete relaxation is not obtained, or is obtained for much shorter periods than in normal persons; the affected muscles kept in a more contracted state gradually shorten and in this way the late contracture is produced.

This explanation, depending on the presence of aberrant nerve fibers in a nerve undergoing regeneration, may be employed also for the contracture which results in various parts of the body after an injury with partial regeneration of the nerve supply of the muscles in which the contracture occurs.

It probably will be found that such contracture occurs with partial recovery of motor power following a nerve lesion rather than with persistent complete paralysis or almost complete recovery. Where every muscle in a nerve distribution is stimulated on attempted innervation of a few muscles of the same distribution, as for example, the contraction of almost the entire muscular supply of the ulnar or median nerve which may occur from attempted isolated movement of a finger in incomplete recovery of the nerve, the result would be overstimulation of the entire group of muscles. It is apparent therefore that when a nerve is divided and sutured, corresponding fasciculi should be placed as nearly as possible in apposition to avoid, so far as possible, the growing of young axis cylinders into peripheral nerve fibers for which they were not intended.

Camptocormia. This designation was introduced by Souques for functional disturbance consisting of forward flexion of the body with, or without, lateral inclination. The distortion seems to originate in pain and has occurred in those who have been affected by shell explosion. Two papers have recently appeared in American literature, one by Hall⁴⁸ and one by Saliba,⁴⁹ in each of which a case is reported. The treatment is by psychotherapy and the results may be very satisfactory. I have seen the condition disappear rapidly under suggestion reinforced by static electricity.

Organic Nervous Disease Following Heat-stroke. As stated by R. M. Stewart,⁵⁰ the immediate effects of heat-stroke (thermic fever) show considerable variation, but symptoms referable to disturbance of the functions of the cerebrospinal nervous system are constantly present. Pathological investigation has shown that the probable seat of the lesion of thermic fever is in the nerve cells of the central nervous system, and particularly those of the medulla oblongata.

The remote effects of heat-stroke vary according to the severity of the case, and may be absent; they are expressed clinically by subtle and ill-defined psychical changes—emotional instability and irritability, lowered tolerance to alcohol, etc.—changes which it is legitimate to assume are determined by microscopic lesions of the cerebrum.

Stewart is not aware that cases of organic nervous disease directly

⁴⁸ Journal of the American Medical Association, February 22, 1919, p. 547.

⁴⁹ *Ibid.*, p. 549.

⁵⁰ Review of Neurology and Psychiatry, March and April, 1918, p. 78.

attributable to heat-stroke have been recorded. He describes a case of much interest in that the remote effects of a severe attack of heat-stroke were manifested by the development of a highly characteristic cerebellar syndrome. Fifteen months after the commencement of the illness many of the initial symptoms had entirely disappeared, and now incoördination of voluntary movements and a profound mental change were the patient's most prominent symptoms.

Stewart believes that diffuse cortical degeneration of the cerebellum is capable of giving rise to a cerebellar syndrome, and that the Purkinje cells are especially liable to damage. Such changes he believes occurred in his case as the result of excessive heat. He would have found support for his views in Archambault's case but this was not reported at the time Stewart wrote his paper.

Luminal in Epilepsy. Luminal and luminal sodium have been found by Dercum⁶¹ to be of great service in epilepsy. He gave the drug at first three times daily as in the administration of the bromides. He found that used in this manner it sometimes made his patients a little heavy during the day and, at times, even a little dizzy. If he limited the administration of the drug to one dose at bedtime he found that these symptoms did not appear while the efficiency of the drug was in no wise impaired, if indeed it was not enhanced. The drug exercised a remarkable control over the epileptic seizures, even in confirmed cases. The doses required were exceedingly small. A grain and one-half of luminal or 2 grains of luminal sodium given at bedtime were ordinarily sufficient. Very rarely had he been obliged to give so large a dose as 3 grains. In a number of instances the use of luminal had resulted in the abolition of the convulsive seizures for periods extending not only over many months, but even over several years. It was in the group of the "essential" epilepsies that the efficacy of the drug had proved most remarkable. At no time was the slightest deleterious effect noted. Respiration, circulation, and temperature are uninfluenced, even by the most prolonged administration, nor is there any induction of a drug habit or craving for the action of the remedy is unattended by either pleasurable or disagreeable sensations.

Dercum has found this drug of great service in disturbed and excited states, as in chorea of severe type. It is very soluble. Its hypodermic administration is unattended by any local irritation and no unpleasant after-effects are experienced. The supply in this country has been exhausted.

Persistent Congenital Edema of the Legs. Rolleston⁶² has observed this peculiar condition in mother and daughter. The mother stated that her mother and her mother's sister were similarly affected. In neither the mother nor the daughter was there any obvious cause for the edema. In both, the heart and lungs were normal, and the urine was free of albumin. In neither was there any local mechanical obstruction to the circulation, such as tight garters. Neither presented any other evidence of vasomotor disturbance, such as urticaria, cyanosis of the hands, or

⁶¹ Archives of Neurology and Psychiatry, May 1, 1919, No. 5, vol. i, p. 654.

⁶² Review of Neurology and Psychiatry, December, 1917, p. 480.

puffiness of the lids. Neither had much inconvenience from the edema which had been present in both since birth. The only subjective disturbance was a feeling of heaviness in the affected limbs, especially after much walking. The two cases presented the four cardinal symptoms of the condition described by Milroy in 1892: (1) Congenital character; (2) limitation of the edema to the lower limbs; (3) persistence of the edema; (4) entire absence of constitutional symptoms. The pathology of this disorder is not known.

Dystonia Musculorum Deformans. This peculiar motor disturbance consisting of spasm of different muscles has been supposed to be progressive, but a case observed by Otto Maas⁶³ seems to show that improvement is possible in rare instances. The improvement was established by Schwalbe and Forster, who had studied the case previously. Maas calls attention to certain resemblances between dystonia and paralysis agitans in the pill-rolling movement, cessation of the tremor in the finger to nose test, and rigidity in the expression of the face. He refers to the statement of Flatau and Sterling that the intelligence is never affected in dystonia, and yet in the case I reported several years ago in the *Journal of Nervous and Mental Disease* the intelligence was decidedly affected.

Continuous Rhythmical Contraction of Muscles. The investigations of Klien⁶⁴ have shown that there is no satisfactory evidence that irritation of motor nerves can cause continuous rhythmical contractions, but such contractions may occur reflexly and as a manifestation of hysteria. Most interesting are his findings as regards these contractions in the muscles of deglutition in association with organic disease of the central nervous system. In three cases in which these involuntary movements occurred, he found apoplectic cysts in the cerebellum. In two of these cases the spasms were unilateral and the lesion was in the cerebellar hemisphere of the same side, and in the other case the spasms were bilateral and cysts were found in symmetrical places in the two cerebellar hemispheres. Klien believes there can be no doubt as to the etiological relation of these cerebellar lesions to the spasms. In all three cases synchronous contractions occurred in other muscles, in one case in the levator palpebrae, in another in the intercostal muscles and the lower facial distribution, and in the third in the orbicularis oculi. Three cases are of sufficient importance to induce Klien to assert that cerebellar disease may cause continuous rhythmical contractions in most different muscles. This conclusion is most interesting and important, but it is wise to maintain a receptive attitude and await further observations in this interesting field.

Pseudo-athetoid Spontaneous Movements. Herman⁶⁵ calls attention to involuntary movements which closely resemble athetoid movements but are not dependent exclusively on disease of the brain, but are observed especially in disease of the spinal cord (tabes dorsalis, syringomyelia, multiple sclerosis) and in other disorders in which the deep sensation is

⁶³ Neurologisches Centralblatt, March 15, 1918, p. 199.

⁶⁴ Monatsschrift f. Psychiatrie und Neurologie, February, 1918, vol. xliii, p. 79.

⁶⁵ Zeitschrift f. d. g. Neurologie und Psychiatrie, 1918, Nos. 1, 2, and 3, vol. xl, p. 194.

lost, as in multiple neuritis. These movements occur only in the limbs in which the deep sensation is seriously affected, and are not associated with increased muscular tonicity. The impairment of the senses of position and passive movement has much to do with the production of these involuntary movements.

The Spinal Reflex. This curious and hitherto unknown reflex is described by Galant.⁶⁶ He made the discovery in examining a very young baby, who was lying with its abdomen on Galant's left hand. Stroking with the handle of the percussion hammer along the baby's back close to the spinal column, the baby's back contracted forcibly and suddenly, bending toward the side stroked with so much power that the child nearly glided from the supporting hand. To this reflex he gives the name Rückgratreflex. Further investigations showed that the older the baby examined, the weaker was this reflex, and it could not be obtained in a baby seven months old. He observed also that in some very young babies an arching of the upper half or even of the whole back occasionally was obtained by stroking along the scapula from the spine to the angle, this he calls the scapula reflex. He examined 105 young babies under one year old and 36 idiots ranging in age from seven to thirty years. In the babies the spinal reflex was obtained by stroking along the entire vertebral column, or from the cervical vertebræ to the angle of the scapula, or along the lumbar vertebræ, and he obtained an arching of the entire back or only of the upper or of the lower portion according to the area irritated. The reflex was found in 104 of the 105 cases. In the idiots the reflex was obtained typically in only two instances.

Veraguth has devoted further study to the back reflexes of men.

Facial Hemiatrophy is usually an acquired condition, but Oppenheim⁶⁷ has observed it in a man as a congenital deformity, and not progressive. It was attributed to pressure *in utero* from a second fetus, as the man had been one of twins. Cases of this congenital defect are known in the literature but are very rare.

Dilatation of the Pupil from Passive Movement of the Upper Limb. Change in the size of the pupil by passive movement of the upper limb is certainly a curious phenomenon, but that it may occur is shown by a case reported by Reitsch and Röper.⁶⁸ The case was one in which a bullet wound implicated the fifth to the seventh cervical vertebræ and immediately the left upper and left lower limb were paralyzed and the right limb was paretic. Sensation was lost from the mammary region downward. A laminectomy after about twelve hours showed a piece of bone from the sixth cervical vertebra pressing on the cord. The spinal cord appeared to be intact, and the operation was followed by improvement. The left cervical sympathetic was paralyzed, *i. e.*, the left palpebral fissure and the left pupil were smaller than the right and there was slight left enophthalmus. The light reflex was preserved on the left

⁶⁶ Schweizer Archiv für Neurologie und Psychiatrie, 1918, No. 2, vol. ii, p. 305.
Veraguth: Neurologisches Centralblatt, April 1, 1918, p. 250.

⁶⁷ Neurologisches Centralblatt, August 1, 1918, p. 513.

⁶⁸ Ibid., February 1, 1918, p. 98.

side, but as the pupil on this side was smaller, the contraction was not so pronounced as on the right side. In perspiring after exertion the left side of the head and face remained dry. Passive movement of the left upper limb caused maximal dilatation of the left pupil, widening of the left palpebral fissure, and sweat secretion on the otherwise dry left side of the face and head. The passive movement of the spastic left upper limb was painful. It made no difference in the result whether the left upper or left lower arm were moved, the pupil remained dilated so long as the limb was moved, and ten to fifteen minutes elapsed after the movements ceased before the pupil contracted again. A light or convergence reaction of the left pupil could not be obtained during the maximal dilatation. The right pupil was not affected.

Although the passive movement was painful, the dilatation of the pupil could not be explained by the pain. The sensory dilatation of the pupil caused by pain does not persist so long after the irritation has ceased, it disappears within a few seconds, and the reflex is bilateral. In the case described above, the dilatation occurred before the passive movements produced pain. The reaction to passive movement must have been caused by irritation of the cervical sympathetic through the spinal cord. The case is one of unusual interest.

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